Indicators for the Washington Innovation Economy

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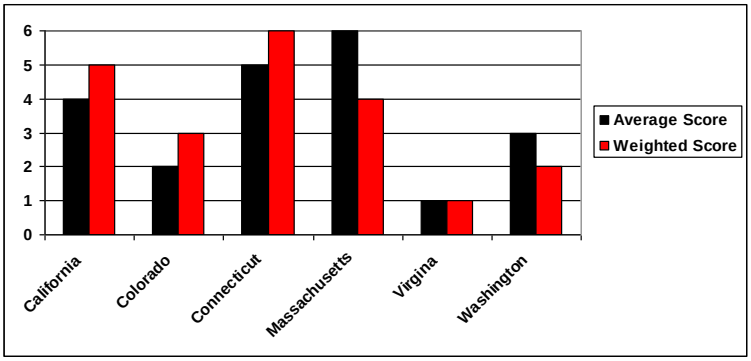
Executive Summary

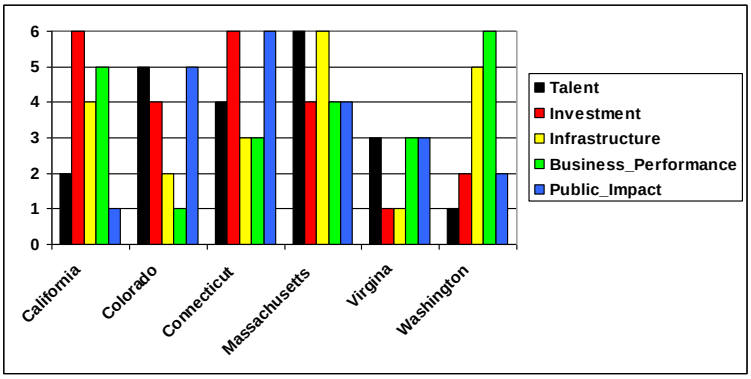
This document provides a "dashboard" assessing characteristics and trends in the Washington state economy relative to an innovation strategy articulated in a February 2009 report from the Washington Economic Development Commission. Several states were defined as peer states based on an analysis of industry structure. Data on a total of 22 indicators are used to develop composite scores on five key dimensions of the innovation economy:

- Talent
- Investment
- Infrastructure
- Business Performance
- Public Impact

These five composite scores were then used to construct an overall "dashboard" index showing Washington's performance relative to the peer states:



Whether one uses weighted or unweighted scores, the overall innovation index for Washington's overall performance lags behind that of California, Connecticut and Massachusetts, but ahead of Virginia, and similar to the scores in Colorado.



Breaking down the overall index into the five components shows that Washington is strong on Business Performance and Infrastructure, but weak in the other three areas. Our nearest peer state, Colorado, is relatively weak in the two areas of Washington's strength, and relatively

strong in the three areas, where Washington is relatively weak. Further variations in strategy are revealed in the other states. In California, the strongest performance is in Investment, followed by Business Performance and Infrastructure. In Connecticut, the strongest components are Investment and Public Impact. In Massachusetts, the strongest components are Talent and Infrastructure. This differences speak to different strategies towards innovation issues that could provide useful policy lessons if investigated further.

Full details on the individual metrics in each of the five components of the overall index are provided in the body of this report. The report starts with a description of the methodology used to select states and to construct the composite indices. Composite scores for each of the five components of the overall index are followed by data sheets for the individual indicators contributing to that component. The data sheets for each of the 22 individual indicators show the trends in Washington since 2000, a comparison with peer states, and where possible a comparison of the performance of the United States against selected other countries.

Concluding comments note that this report takes its place among several recent efforts to characterize the strengths and weaknesses of Washington's economy statewide and at the regional level as a basis for improving economic competitiveness.

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Introduction

This document presents indicators for the Washington State economy, related to the strategy outlined by the Washington State Economic Development Commission (WEDC) in February 2009[1]. This strategy revolves around innovation inputs and measures of innovation performance. Three broad indicators of innovation performance were outlined: talent, investment (entrepreneurship), and infrastructure. Innovation performance was related to business performance and the public impact of the innovation economy. Within each of these five categories, a number of individual metrics are offered. We have attempted to develop measures of the dimensions suggested by the WEDC report, for Washington state compared to a selected set of U.S. states, as well as with selected foreign countries. We were not able to develop measures for all of the dimensions identified in the February 2009 WEDC report. Future research may find estimates for these additional measures.

Data for each indicator are presented in this report, showing the trend in Washington on that measure, and comparisons of Washington's recent performance with peer states and selected countries. In addition, a "dashboard" is developed to summarize all of the information in a concise way. The dashboard is based on composite indicators that bring together information from each indicator with the five broad categories.

Methodology

Five states were selected to use as peers in this analysis. These states were selected because their industrial structure resembles that of Washington to some degree. The table on the next two pages shows the data used for this analysis. A list of 16 industries was compiled including major industries in various parts of the state, including both rural- and urban-based industries. 15 states were chosen as potential peer states on the basis of broad similarity in size or industrial structure. Next, location quotients were computed for each of these industries in each of the 15 states. A location quotient is a "ratio of ratios." The ratio in the numerator of the expression is a specific industry's employment level divided by total employment in each state. In the denominator is the same ratio for the nation as a whole. If a particular state has an unusually high level of employment in a particular industry, the resulting location quotient will be greater than 1. Large location quotients are a measure of the competitive strength of an industry in a particular place. For all 16 of the selected industries, Washington has a large location quotient, ranging from 1.05 for breweries to 11.1 for non-citrus fruit and tree nut farming. Next, the data for the other 15 states was scanned, noting the presence of LQs greater than 1. The total number of industries in a state with an LQ greater than 1 is a measure of the similarity of the industrial structure in that state to Washington's industry structure. Virginia has 7 industries meeting this criterion; California and Massachusetts have 6 industries; and Connecticut and Georgia have 5. These five states constitute the peer states used in this analysis.

[1] Washington State Economic Development Commission, The Washington Innovation Economy: New Economic Strategy for Prosperity. February 2009.

LQ Analysis - Industries in Which WA Has an LQ >1 Shaded cell: LQ >1

No. LQs > 1	4	6	5	5	4	3	6	3
Industry	**Arizona**	**California**	**Colorado**	**Connecticut**	**Georgia**	**Maryland**	**Massachusetts**	**Minnesota**
Base Industry: Total, all industries	2,174,919	13,039,293	1,943,153	1,437,388	3,343,661	2,067,214	2,831,525	2,304,189
NAICS 111 Crop production	0.85	2.83	0.63	0.53	0.62	0.22	0.22	0.57
NAICS 11133 Noncitrus fruit and tree nut farming	0.17	4.59	0.06	0.18	0.37	0.02	ND	ND
NAICS 113 Forestry and logging	ND	0.42	ND	0.01	2.94	0.21	0.06	0.64
NAICS 311 Food manufacturing	0.36	0.89	0.73	0.37	1.54	0.57	0.62	1.43
NAICS 3117 Seafood product preparation and packaging	NC	0.28	ND	0.15	ND	1.04	2.82	0.49
NAICS 31192 Coffee and tea manufacturing	ND	0.91	1.73	1.25	ND	0.53	0.36	ND
NAICS 31212 Breweries	ND	1.02	7.58	ND	1.58	ND	0.45	0.77
NAICS 31213 Wineries	0.11	6	0.23	0.23	0.05	0.1	ND	ND
NAICS 321 Wood product manufacturing	1.11	0.70	0.62	0.32	1.64	0.48	0.35	1.81
NAICS 3364 Aerospace product and parts manufacturing	2.89	1.26	0.84	5.07	1.33	0.59	0.97	ND
NAICS 3366 Ship and boat building	0.09	0.56	0	ND	ND	0.27	0.14	0.73
NAICS 45411 Electronic shopping and mail-order houses	0.59	0.76	0.93	1.27	0.53	0.82	1.5	1.15
NAICS 4831 Sea, coastal, and Great Lakes transportation	0.35	NC	0.6	1.71	ND	0.98	1.66	0.55
NAICS 5112 Software publishers	1.87	1.43	2.73	0.65	1.41	0.42	3.44	1.13
NAICS 5417 Scientific research and development services	1.18	1.63	1.31	0.72	0.22	1.64	1.05	0.98
NAICS 813211 Grantmaking foundations	ND	0.94	2.37	1.21	0.31	2.79	2.84	0.27

(ND) Not Disclosed

No. LQs > 1	3	2	4	1	1	7	4	
Industry	**New Jersey**	**New York**	**North Carolina**	**South Carolina**	**Texas**	**Virginia**	**Utah**	**Washington**
Base Industry: Total, all industries	3,321,919	7,163,286	3,358,606	1,539,181	8,711,773	2,990,921	1,021,547	2,429,793
NAICS 111 Crop production	0.5	0.32	0.74	0.67	0.53	0.37	0.35	4.98
NAICS 11133 Noncitrus fruit and tree nut farming	0.32	0.35	0.11	ND	0.06	0.16	0.15	11.1
NAICS 113 Forestry and logging	0.02	0.19	1.76	3.72	0.45	1.2	0.09	3.56
NAICS 311 Food manufacturing	0.68	0.53	1.23	0.87	0.77	0.78	1.12	1.07
NAICS 3117 Seafood product preparation and packaging	0.51	0.18	0.54	ND	0.48	1.65	NC	8.11
NAICS 31192 Coffee and tea manufacturing	1.63	0.7	ND	ND	0.63	2.09	ND	3.71
NAICS 31212 Breweries	ND	0.91	1.11	0.02	0.91	1.97	ND	1.05
NAICS 31213 Wineries	0.14	0.73	0.42	0.02	0.2	0.7	NC	2.25
NAICS 321 Wood product manufacturing	0.37	0.36	2.06	1.54	0.85	1.63	0.93	2.03
NAICS 3364 Aerospace product and parts manufacturing	0.1	0.23	0.26	0.2	1.25	0.1	1.91	7.68
NAICS 3366 Ship and boat building	0.41	0.08	0.75	1.29	0.64	5.52	0.02	2.27
NAICS 45411 Electronic shopping and mail-order houses	0.56	0.81	0.89	0.43	0.69	0.41	2.21	1.67
NAICS 4831 Sea, coastal, and Great Lakes transportation	1.29	0.75	1	0.33	0.83	0.69	ND	3.68
NAICS 5112 Software publishers	0.55	0.25	0.69	0.37	0.87	0.75	2.41	9.03
NAICS 5417 Scientific research and development services	1.71	1.22	0.71	0.34	0.55	0.81	0.7	1.44
NAICS 813211 Grantmaking foundations	0.39	1.99	0.54	0.36	0.55	1.54	0.14	1.17

In addition, several countries were selected for international comparisons, including countries in Europe and Asia. Countries that are significant competitors in various industries were included. For example, France was selected due to its strengths and aircraft production as well as agriculture and food processing. Ireland was selected due to its strength in information technology. Japan was included as a major competitor in many industries. The availability of data was a major consideration in the selection of countries as well. Outside of the countries covered in data from the Organization for Economic Cooperation and Development, there are many problems in finding data for the many of the indicators used in this report. Consequently, all international comparisons are with OECD member countries, and even within this set there are significant problems in data comparability. Thus, these comparisons are included on the individual data sheets making up the bulk of this report, but no attempt has been made to construct a "dashboard" for these international comparisons as was done with the peer states.

The following matrix shows the individual metrics chosen to assess Washington's performance in the five broad areas. Definitions of each category within the broad areas are offered on the data sheets in the second section of the report. The two indicators for which we were not able to find data to conduct peer state comparisons are noted in this matrix in italic font.

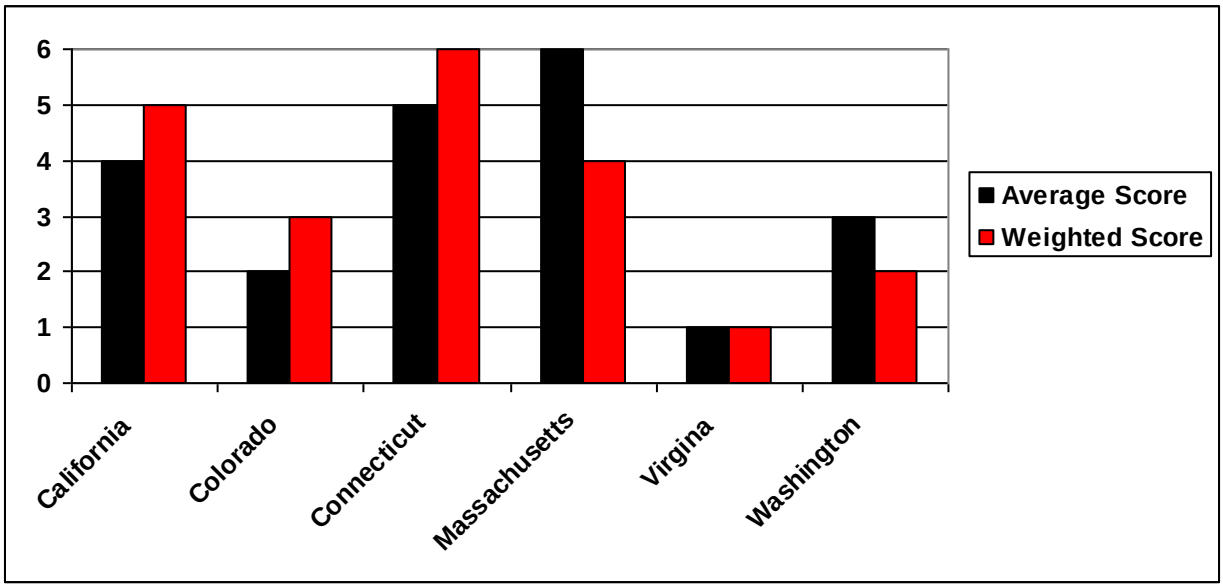
Talent	**Investment**	**Infrastructure**	**Business Performance**	**Public Impact**
Education Pipeline	R&D Intensity	Business Climate	Productivity	State GDP
Workforce Quality	Business Startups	Transportation	Exports	Employment Growth
R&D Potential	Inward Investment	Broadband	Market Capitalization	Income Distribution
STEM Production	Capital Access	Energy	*New products and services -no data found*	State Revenues
Lifelong Learning		Sustainability	*Profitability -no data found*	Standard of living

The dashboard for state comparisons was constructed by creating scores for the five peer states and Washington on each measure. Then two methods for constructing a composite measure were utilized – a simple average of the scores across all measures in a given category, and a weighted average, where the weights were assigned in this draft report arbitrarily. The idea of such weighting was that the EDC could determine how important it considered the constituent parts of these indicators. Such weightings could alter the scores, and would require re-creation of the graphics. In these graphics a high value indicates a strong position on a particular indicator, while a low value indicates a weak position on that indicator. We show results for both unweighted and weighted composite scores in the dashboard below (Figure A on p. 5).

Findings: How Washington Compares

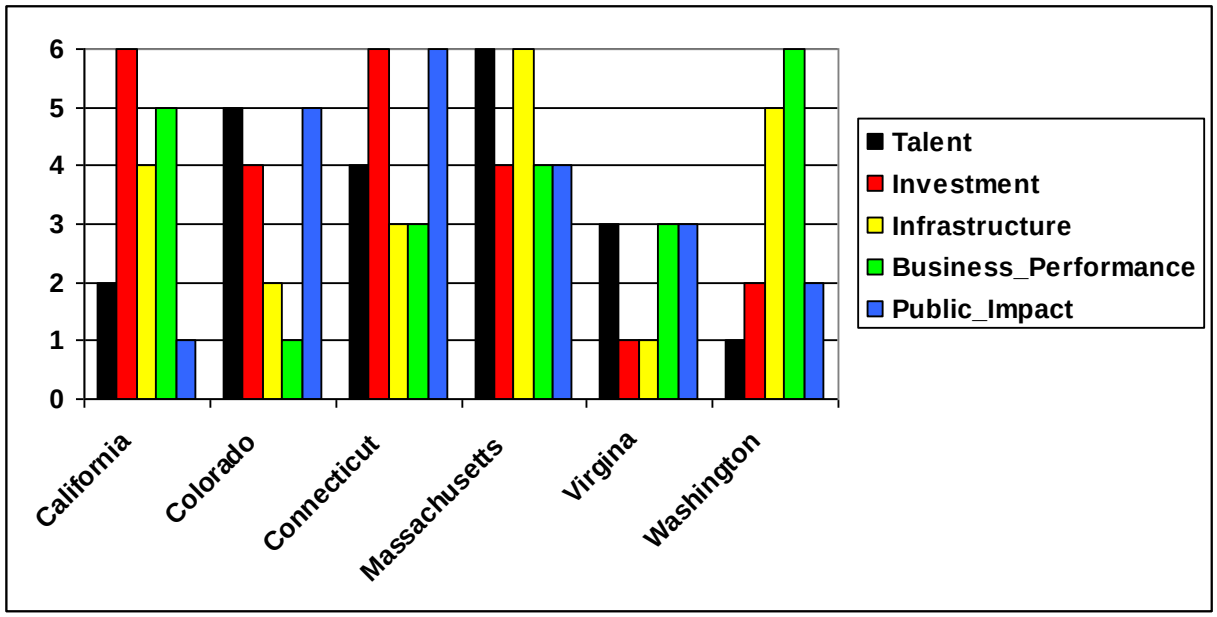
We have summarized the position of each state on the composite values for both innovation inputs and innovation performance in Figure A. This figure has two measures: the average score of each state, and then a weighted score where each of the five components was given an equal weight. The two measures present slight differences in the position of each state. Colorado and Massachusetts fare best on these two measures, while Washington State falls into the lower tier of state scores.

Figure A Summary of State Scores



The summary "dashboard" displayed in Figure A was based on scores for individual indicators, which are displayed in Figure B. This figure displays the average score of each state on the five broad categories of indicators used in this analysis. Figures are included later in this report documenting the contribution of individual metrics within the five broad areas covered in this research project. Figure B shows that the states used in this analysis had varying levels of performance on the five broad categories. Connecticut's high score is related to its relatively strong performance on investment and public impact, and its middle position on talent. Massachusetts scores high on talent and infrastructure, does well on public impact, but fares less well on business performance and investment. Washington's position is clearly drawn down by poor performance on talent, investment and public impact, while we do very well on business performance and infrastructure.

Figure B Summary Scores for Components of the Innovation Economy



The position of the states on the composite scores shown in Figure A could change if different weights were used to bring together the individual indicators. Similarly, the components of the five broad measures of the innovation economy could have their constituent components weighted in a different manner, which would change the scores The impact of weighting is discussed further below in the discussion of each of the five broad indicators.

Breaking down the overall index into the five components shows that Washington is strong on Business Performance and Infrastructure, but weak in the other three areas. Our nearest peer state, Colorado, is relatively weak in the two areas of Washington's strength, and relatively strong in the three areas where Washington is relatively weak. Further variations in strategy are revealed in the other states. In California, the strongest performance is in Investment, followed by Business Performance and Infrastructure. In Connecticut, the strongest components are Investment and Public Impact. In Massachusetts, the strongest components are Talent and Infrastructure. These differences speak to different strategies towards innovation issues that could provide useful policy lessons if investigated further.

The text and graphics below describe Washington's position on each of the broad indicators of the innovation economy, and it presents composite graphics related to the performance of Washington and peer states on the elements of the broad indictors.

Talent

Four measures of talent were developed in this analysis. They are measures of R&D personnel, STEM proficiency, the education pipeline, and workforce quality. Figure C shows Washington's position on the composite of these indicators, and we do not score highly. A simple average of these indicators places Washington last among the peer states, while the weights chosen led us to a 4th place position.

Figure C Talent Scores

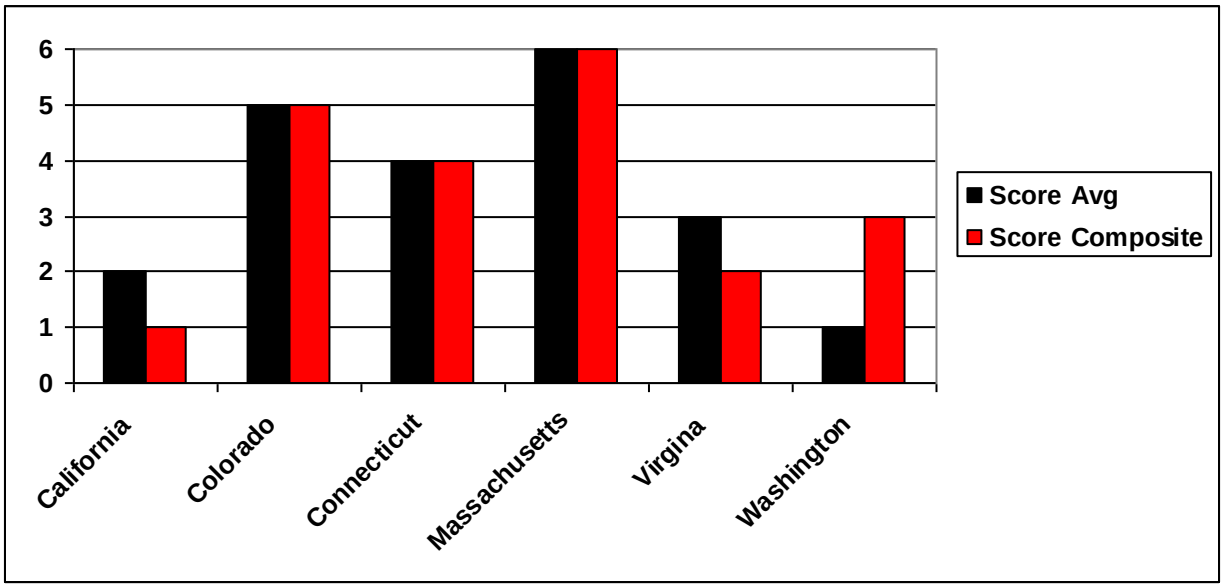
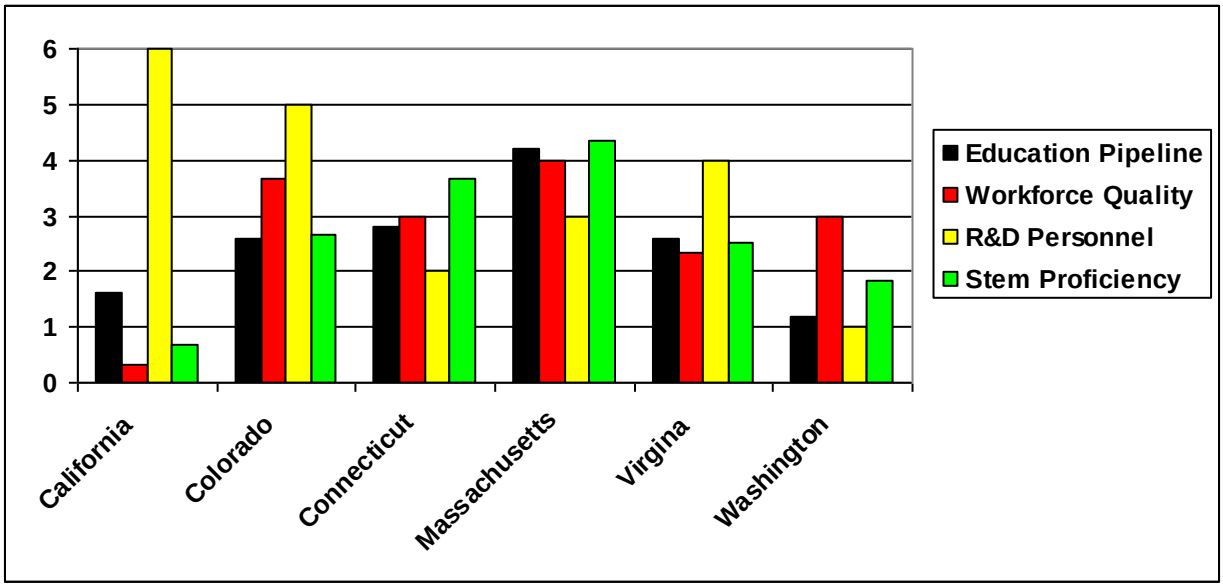


Figure D indicates that Washington's low average score comes from relatively low scores for the education pipeline, R&D personnel, and STEM proficiency. Washington does better on workforce quality, scoring in the middle of the peer states.

Figure D Scores for components of the talent measure.



Talent Education Pipeline

Trends in Washington

College and university degree production has been going up in Washington at all degree levels except for the doctoral degrees.

Degrees Granted by Degree Granting Institutions in Washington

	Associate's degrees per 1000 residents 18-24	Bachelor's degrees per 1000 residents 18-24	Master's degrees per 1000 resident 15-44	First-professional degrees per 1000 resident 15-44	Doctor's degrees (Ph.D., Ed.D., etc.) per 1000 residents 15-44
2000-01	32.03	40.13	2.91	0.25	0.44
2001-02	33.25	40.60	2.82	0.24	0.45
2002-03	35.19	41.87	3.09	0.45	0.25
2003-04	37.30	42.92	3.13	0.43	0.27
2004-05	33.69	44.29	3.27	0.48	0.33
2006-07	34.46	48.02	3.22	0.49	0.34
2007-08	35.44	49.37	3.23	0.49	0.35

Source: National Center for Education Statistics

Washington Compared to Other States and Nations

Compared to peer states, Washington produces a higher level of associate's degrees than any of the peer states or the United States as a whole. However, this advantage in degree production falls off as one moves up the education ladder. Washington lags all but one peer state and the nation at the baccalaureate level, and all of the peer states and the nation for the three graduate degree categories.

Description

This indicator is the number of diplomas and degrees granted by education institutions as a percentage of the population of an age to have achieved that level of education.

Importance

Students who earn high school diplomas and college degrees are preparing to contribute to the innovation economy. Young people who fail to graduate from high school and who do not go on to college will be less equipped to compete for good jobs in the future.

Data Sources and Quality

Data come from the National Center for Education Statistics. One issue to note in interpreting these data is that Washington graduates many students from in-state universities who transfer from community colleges. As a consequence, this state may have more graduates aged above 24 than other states; the NCES data understate the full degree production of Washington's universities.

Determinants

High school completion rates are correlated with race/ethnicity. Some minority group cohorts are less likely than Caucasians to complete high school; others are more likely. Baccalaureate and higher degree completion depends both on the student's preparation for college and the availability of seats in higher education in the state. Young people from rural counties are less likely to go on to college than those from urban counties. Graduate degree production is limited by the number of seats available in these programs.

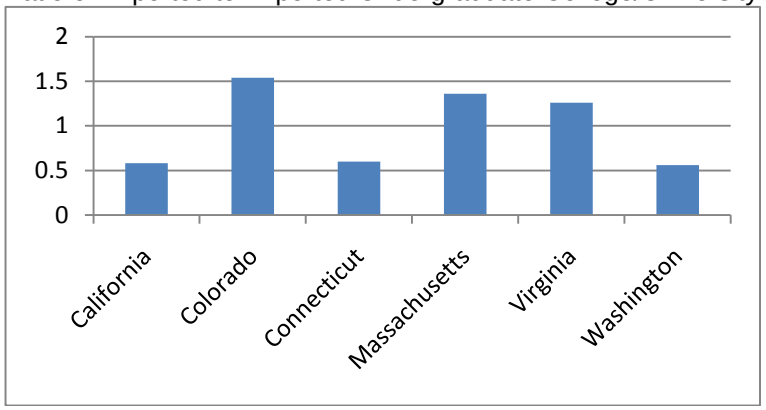
Degree Production by Level, 2007-08

	Associate's degrees per 1000 residents 18-24	Bachelor's degrees per 1000 residents 18-24	Master's degrees per 1000 residents 15-44	First professional degrees per 1000 residents 15-44	Doctor's degrees (Ph.D., Ed.D., etc.) per 1000 residents 15-44
California	25.32	41.40	3.69	0.56	0.47
Colorado	24.39	63.46	5.59	0.50	0.50
Connecticut	15.67	58.00	6.11	0.67	0.55
Massachusetts	17.04	77.26	10.86	1.67	1.16
Virginia	23.22	54.18	4.55	0.84	0.54
Washington	35.44	49.37	3.23	0.49	0.35
United States	24.69	51.68	4.79	0.71	0.48

Source: National Center for Education Statistics

One issue to take into account in interpreting the degree production data is that Washington "exports" more undergraduate students to colleges and universities in other states than most states. According to data from the National Center on Higher Education Management, only 3 states export more of their undergraduate students to other states than does Washington. The chart below shows how we stand relative to the peer states. Half of the states in this chart are net importers, while Washington is one of three net exporters. California, also a net exporter, also has a relatively low bachelor's degree production level as shown in the table above, but Colorado, also a net importer, has a high level of degree production. Thus the imports/exports ratio alone does not explain the differences in degree production.

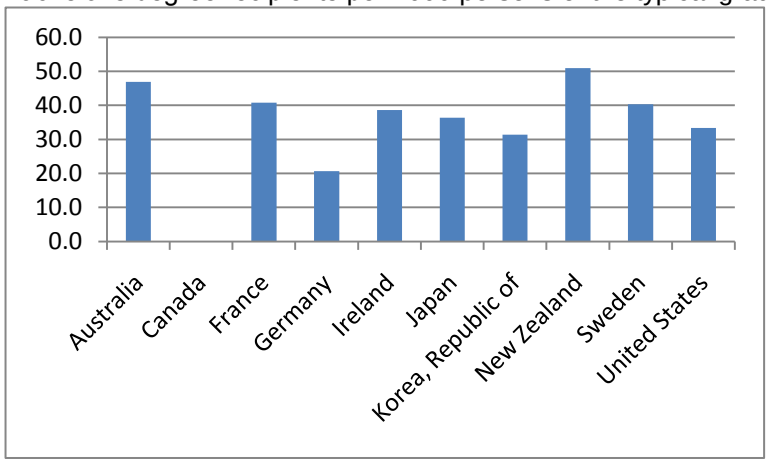
Ratio of Imported to Exported Undergraduate College/University Students by State



Source: National Center on Higher Education Management

Compared to other nations, the United States falls in the middle, with Australia, New Zealand, and Sweden having a higher rate of baccalaureate graduation, and France, Ireland, Japan, and Korea having a similar level. Germany, which sends many young people through its well known apprentice system, produces fewer university graduates.

Bachelor's degree recipients per 1000 persons of the typical graduation age



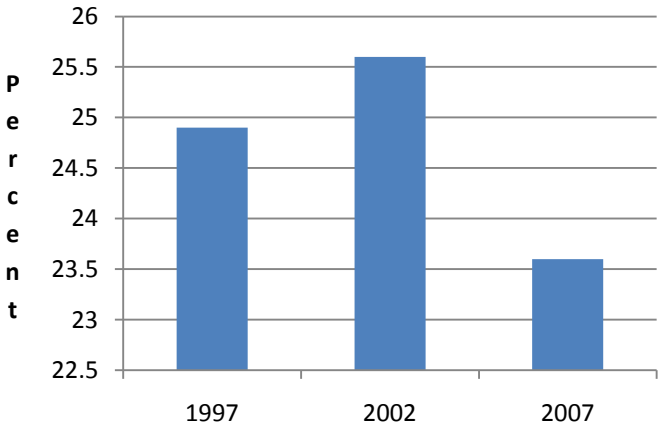
Source: National Center for Education Statistics

Science and Engineering Degrees

Trends in Washington

Production of science and engineering degrees increased from 24.9 percent of all baccalaureate and graduate degrees granted by higher education institutions in Washington in 1997 to 25.6 percent 2002. However, this improvement in emphasis on science and engineering studies was lost in the ensuing five years, as the percentage of science and engineering degrees fell back to 23.6 percent.

Science and Engineering Degrees Granted by Washington's Higher Education Institutions, 1997 to 2007



Source: National Science Foundation (using data from the National Center for Education Statistics)

Description

This indicator is the number of baccalaureate and graduate level degrees granted by higher education institutions as a percentage of all degrees granted.

Importance

Students who earn degrees in science and engineering are preparing to contribute strong technical skills to the innovation economy. Continued progress in advanced technology depends on a strong supply of workers with these degrees

Data Sources and Quality

Data come from the National Center on Education Statistics, which surveys degree granting institutions. The specific table comes from the National Science Foundation's Science & Engineering Indicators report.

Determinants

The preference of students for particular majors depends on their interests and perceptions of labor market conditions, and on the ability of higher education programs to support programs in expensive fields requiring laboratory and other equipment, as well as faculty who command high salaries.

Washington Compared to Other States and Nations

The secular trend in Washington was matched in the U.S. as a whole and among peer states. Science and engineering degree production in all of these jurisdictions rose from 1997 to 2002 but fell from 2002 to 2007. However, the level of these degrees from Washington's colleges and universities was much lower in all years than in any of the peer states or the nation as a whole. Furthermore, the extent of the decline from 2002 to 2007, 2 full percentage points, was larger in percentage terms than the declines in all of the peer states except Colorado where the decline in percentage terms was even more precipitous.

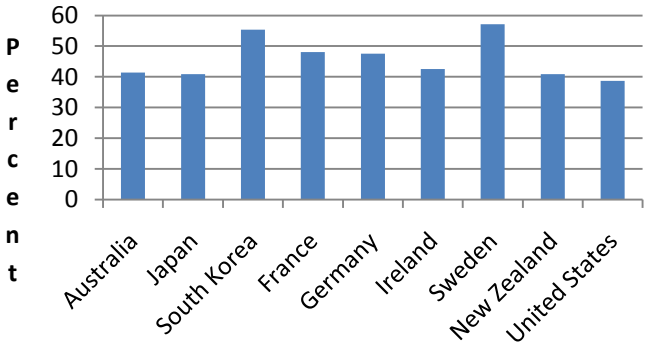
Science and Engineering Degrees Granted, 1997 to 2002

	1997	2002	2007	1997	2002	2007
California	66,347	77,904	89,947	43.8	44.1	43.9
Colorado	11,427	13,308	13,729	40.4	42.4	38.2
Connecticut	7,153	7,294	9,052	33.6	31.8	32.6
Massachusetts	22,537	24,538	26,363	33.8	34.4	33.6
Virginia	16,270	17,956	20,679	35.3	38.4	37.4
Washington	10,761	12,292	14,026	24.9	25.6	23.6
United States	538,702	597,517	685,914	32.9	33	32.1

Source: National Science Foundation (using data from the National Center for Education Statistics)

The United States has a lower level of science and engineering degree awards than any of the other nations shown in the figure below. The percentage of all graduates in these fields in the United States (39%) is slightly lower in than most of the nations shown, but substantially lower than in Sweden (57%), South Korea (55%), France (48%) or Germany (48%).

Science and Engineering Graduates by Country
(as percentage of all first university and doctoral degrees)



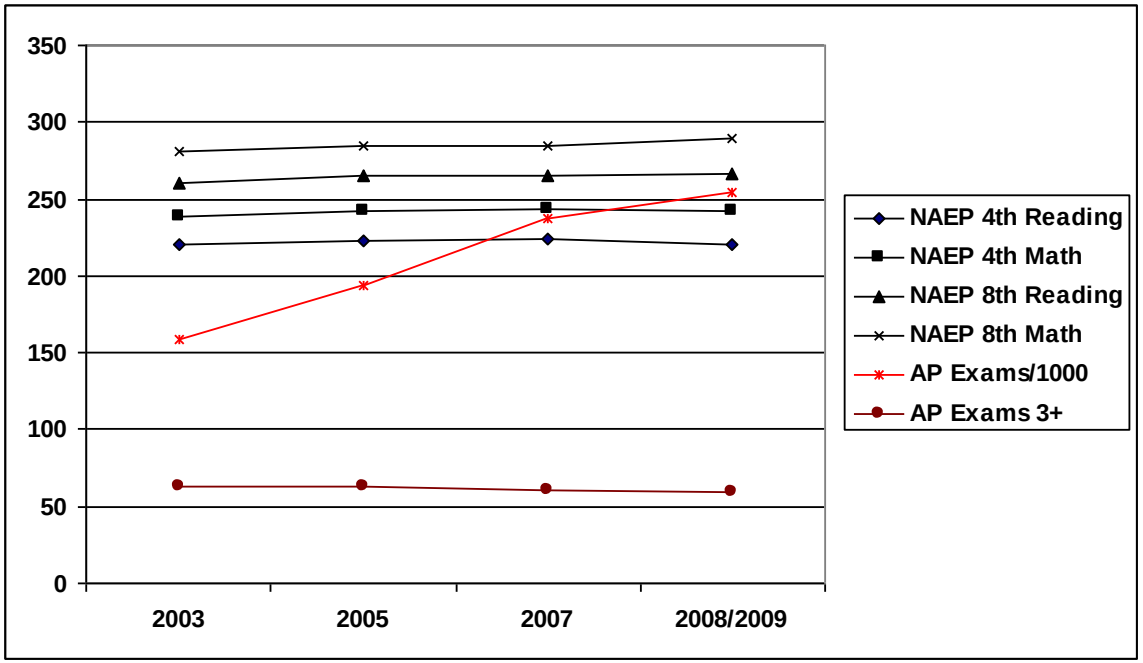
Source: National Science Foundation

STEM Profiency

Trends in Washington

NAEP test scores are the standards used across the US for student performance. Washington's position on these tests has changes very little over the time period for which these data are available. In contrast, the percentage of Washington students taking Advanced Placement tests (AP) has risen sharply. The share of students taking three or more AP exams has not increased in Washington State.

Washington State K-12 Performance, 2003-2009



Source: NAEP 2003-2009

Metric Description

This indicator provides measures of the performance of the K-12 system in Washington State, in terms of student achievement.

Importance

The K-12 education system is the primary pipeline for students into the workplace or into higher education. A high level of performance will help young people prepare to contribute to the innovation economy.

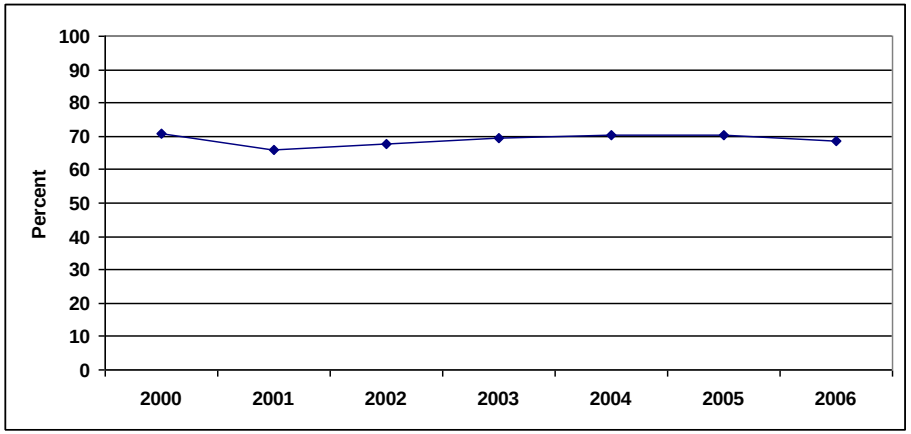
Data Sources and Quality

Data come from the National Center for Higher Education Management Systems, the National Center for Education Statistics (Institute of Education Sciences and the National Assessment of Educational Progress), and The College Board.

Determinants

These data are determined based upon the number of students in primary and secondary education in Washington State and their test scores.

High School Graduation Rates, 2000-2006



Source: National Center for Education Statistics

Washington Compared Nationally and Peer States

Washington State does not rank well compared to the peer states used in this report on these measures. On the NEAP reading and mathematical scores, Washington is in the lower tier of states at the 4th grade level, but improves to the upper third of states on the 8th grade measures. However, Washington's high school graduation rate is low compared to peer states, and is at the bottom of the ranking of states in terms of advanced placement exams taken per 1000 students. No comparable international data are available.

Test Scores of K-12 Students

	NAEP Reading 4th 2009	NAEP Math 4th 2009	NAEP Reading 8th 2009	NAEP Math 8th 2009	HS Graduation Rate 2006	AP Exams/ 1000 2008
California	210 (6)	232 (6)	253 (6)	270 (6)	65.8 (6)	360 (2)
Colorado	226 (4)	243 (3)	266 (4)	287 (3)	70.4 (3)	347 (3)
Connecticut	229 (2)	245 (2)	272 (2)	289 (2)	77.3 (1)	337 (5)
Massachusetts	234 (1)	252 (1)	274 (1)	299 (1)	74.7 (2)	344 (4)
Virginia	227 (3)	243 (3)	266 (4)	286 (5)	68.3 (5)	482 (1)
Washington	221 (5)	242 (5)	267 (3)	289 (2)	68.6 (4)	254 (6)
U.S.	220	239	262	282	73.9	

Source: NAEP, 2003-2009

Workforce Quality

Education Attainment

Trends in Washington

There has been a slight downward trend since 2000 in the percent of Washington's population with at most a high school diploma or GED certificate. On the other hand the percent of the state's population with at least a baccalaureate degree has gone up by 1.4 percent. These trends suggest a more polarized population, with some residents having limited education and others being well prepared to participate in the 21st century workforce.

Education Attainment of Washington Residents

	High school completion	Bachelor's degree
2000	91.8	28.6
2001	n/a	n/a
2002	90.4	28.3
2003	n/a	n/a
2004	89.7	29.9
2005	88.8	30.1
2006	88.9	30.3
2007	89.0	30.0

Source: Census, American Community Survey

Washington Compared to Other States and Nations

Compared to other states, Washington has a high percentage of high school graduates in its population, this state is substantially ahead of the nation in the percentage of residents with at least a higher than the national average by nearly 5 percent, and ahead of competing states by a percent or less. However, at the baccalaureate and higher degree levels, this educational advantage breaks down. While baccalaureate degree, and slightly ahead of the nation in the percentage of residents with a graduate or professional degree, Washington lags behind 2 competing states at the

Description

Workforce quality can be measured by the level of education of the workforce resident in a state or nation.

Importance

Education attainment is a key aspect of workforce quality. In an economy with increasing use of advanced technology and tending towards more service employment as opposed to goods production, a more highly educated workforce is a competitive advantage.

Data Sources and Quality

In the U.S., the Census provides data on the education attainment of persons aged 25 or older (who may or may not be in the workforce), including the percent of the population aged 25 or more who have earned a high school diploma, a baccalaureate degree or an advanced graduate degree.

Determinants

The education level of the population in Washington is determined both by the rate at which the state educates its own youth and adults, and by the rate of in-migration and the educational attainment of in-migrants from other states and countries. Washington has a relatively low rate of production of

baccalaureate level and behind 3 competing states at the graduate or professional degree level.

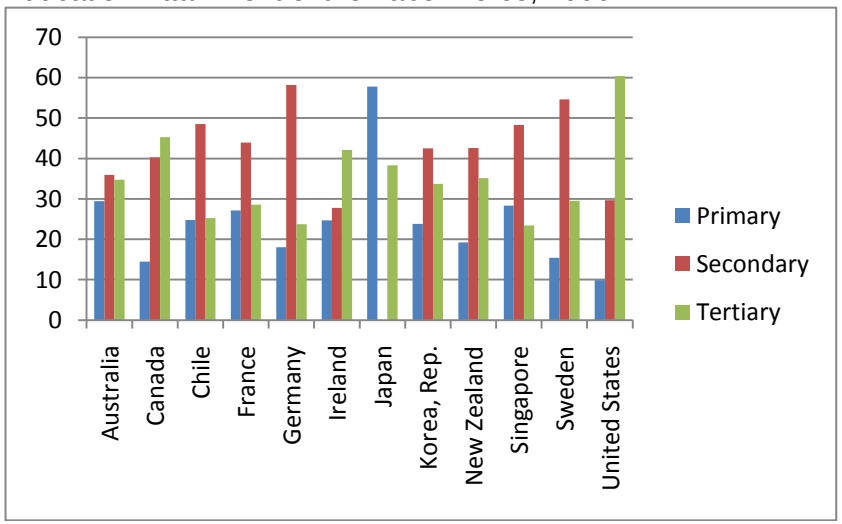
Education Attainment by State

	High school or higher	BA	Graduate or professional degree
California	80.1	18.6	10.4
Colorado	88.1	22.2	12.3
Connecticut	88.1	19.4	14.2
Massachusetts	88.0	21.2	15.5
Virginia	85.3	19.5	13.3
Washington	88.9	19.8	10.5
U.S.	84.1	17.1	9.9

Source: Census, American Community Survey, 2006

Data from the World Bank indicate that the United States has a fairly typical level of education attainment in its labor force compared to other advanced industrial countries. The United States has the highest level of tertiary education; we call this category post-secondary education in this country. Because the percentage of the population that goes on to additional education after high school is very high, the percentage whose highest level of education is at the primary or secondary level is lower.

Education Attainment of the Labor Force, 2006



Source: World Bank, World Development Indicators

Lifelong Learning

Trends in Washington

Only a small percentage of the adult population in Washington participates in postsecondary education, and there is no clear trend in the data. Starting from a high point of 1.6 percent in 2000, the percentage dipped down in the middle of the decade, and then began to creep back up with nearly as many participants, but a lower percentage of the population in 2007 as compared to 2000. The percentage trends reflect changes in the number of participants, which may reflect variation s in funding for adult basic education or workforce training programs.

Education Participation by Adults

	Adult Participants	Adults 18-64 yrs old	Adult participants as percent of adult population
2000	57,999	3,666,576	1.6%
2003	55,363	3,715,713	1.5%
2004	40,193	3,770,774	1.1%
2005	50,386	3,835,485	1.3%
2006	52,810	3,918,196	1.3%
2007	57,474	3,990,018	1.4%

Source: Census, American Community Survey

Washington Compared to Other States and Nations

Washington has a higher adult participation rate than the nation as a whole, and a higher rate than peer states except for California. While California's participation rate is very high, Massachusetts and Virginia are at the opposite end of the spectrum with very low rates. Washington is in a comfortable position, not near either end and a bit above the national rate.

Description

Lifelong learning is a descriptor of adult participation in post-secondary education.

Importance

Lifelong learning keeps the workforce competitive and enables individuals to retrain for a different occupation. A more flexible and competitive economy should result from higher rates of adult education participation, and individuals should have better incomes as well.

Data Sources and Quality

In the U.S., the Department of Education surveys post-secondary institutions to ascertain the number of adult learners. Internationally, more complicated estimates indexed by age grouping of students are prepared by the Organisation for Economic Cooperation and Development.

Determinants

Variations in trends across time may reflect changes in program funding. In recessionary years governments may be willing to increase spending on workforce education programs. Differences across nations reflect national values and circumstances. Sweden, for instance, commits substantial resources to adult education. Korea's commitment to adult education is part of its national development strategy.

Adult participation in state-administered postsecondary education, 2007

	Adult Participants	Adults 18-64 yrs old	Adult participants as percent of adult population
CA	602,837	23,165,698	2.6%
CO	14,683	3,176,151	0.5%
CT	27,549	2,209,809	1.2%
MA	21,706	4,157,960	0.5%
VA	30,940	4,976,390	0.6%
WA	57,474	4,174,204	1.4%
US	2,302,827	189,831,466	1.2%

Sources: National Center on Education Statistics and Census

Using age cohort participation rates, OECD presents a slightly more complicated picture of participation rates. The United States has a higher cohort-specific participation rate for students in their 20's than France or Ireland, and is close to Germany's rate and well behind Sweden's. Moving to the students in their 30's and those aged 40 and over, the United States has the second highest rate, eclipsed only by Sweden. The United States performs quite well on this measure.

Education Participation of Adults by Country and Age of Student

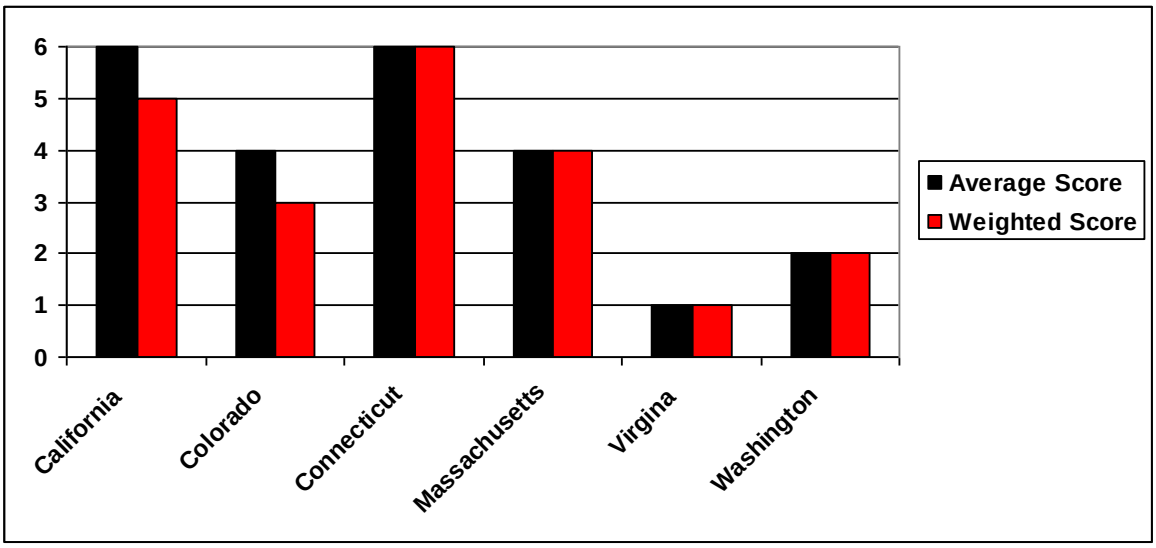
	20-29 as a percentage of the population aged 20-29	30-39 as a percentage of the population aged 30-39	40 and over as a percentage of the population aged 40 and over
France	20.1	2.6	n/a
Germany	28.2	2.5	0.1
Ireland	20.9	4.0	0.1
Korea	27.3	2.0	0.5
Sweden	36.4	13.3	3.0
United States	23.1	5.2	1.4

Source: OECD Education at a Glance

Investment / Entrepreneurship

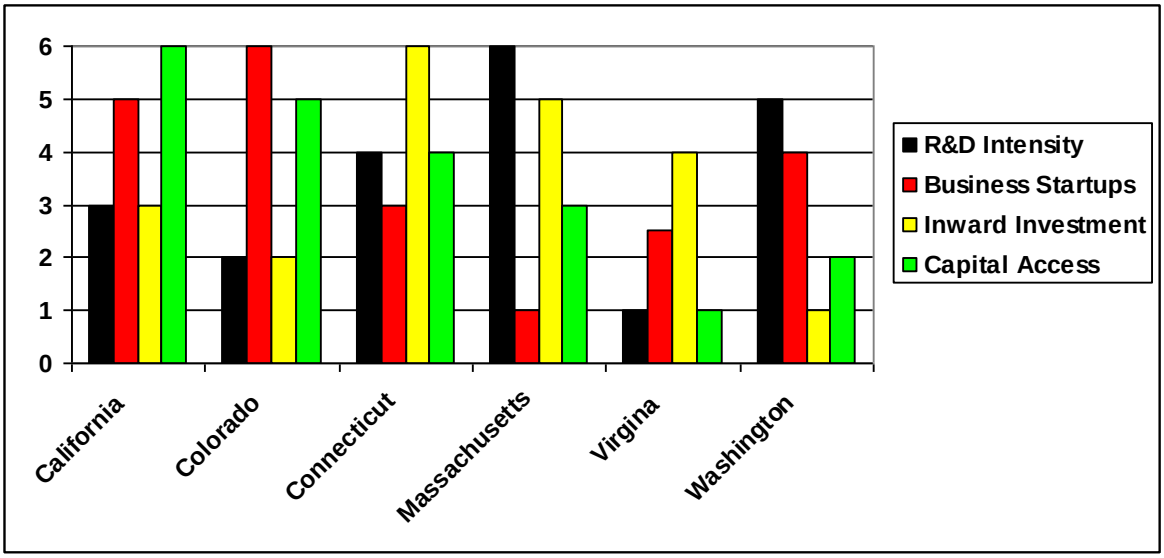
Four measures of investment or entrepreneurship were developed: R&D intensity, business startups, capital access, and inward investment. Figure E shows the average and weighted scores for this measure, and Washington places low on these measures.

Figure E Composite Scores for Investment / Entrepreneurship



The relatively low score that Washington has on the investment / entrepreneurship measure is related to the state's relatively poor scores on inward investment and capital access, as documented in Figure F. The state scores relatively well on R&D intensity, and places in the middle on business startups.

Figure F Score on Components of the Investment/Entrepreneurship Indicator



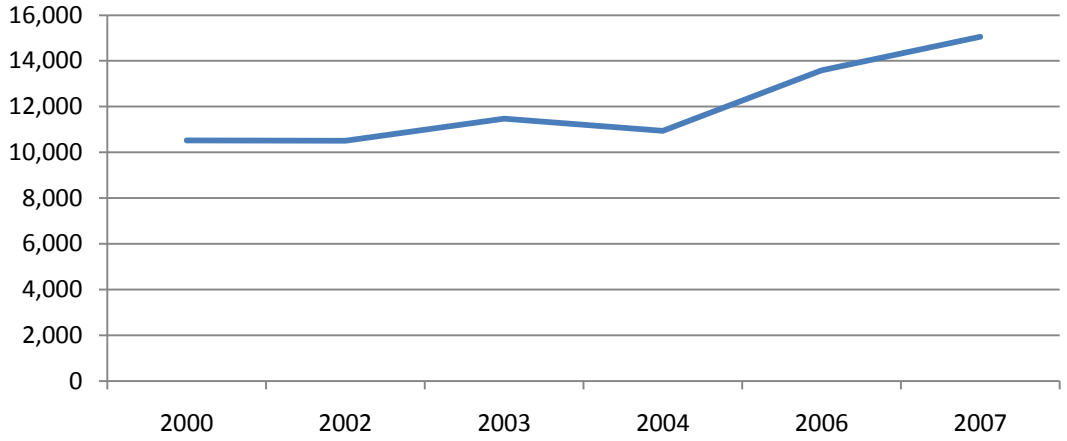
Investment R&D Intensity

Research and Development Intensity

Trends in Washington

After remaining fairly stable during the first part of the decade, since 2004 Washington State has received an increasing level of R&D funding.

Washington State Total R&D, 2000-2007 ($millions)



Source: AAAS, NSF, 2000-2007

Metric Description

Research and development intensity is the ratio of research and development funding to gross domestic product.

Importance

Investment in research and development is an important part of business and public investment. Research and development activity is often the genesis that develops new markets, solves critical efficiency problems, and provides treatment options for disease and medical conditions.

Data Sources and Quality

The sources of research and development data are the National Science Foundation, AAAS and World Bank.

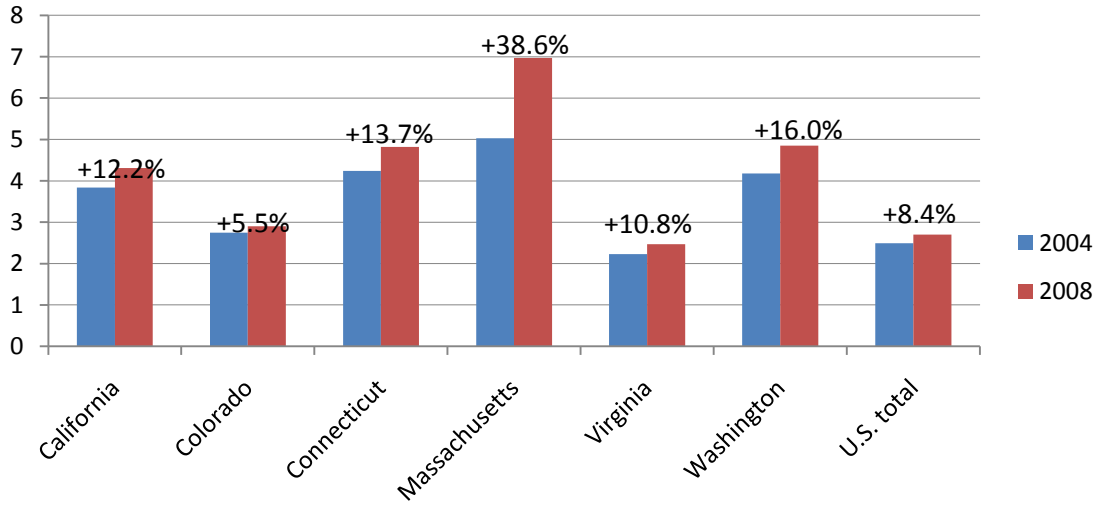
Determinants

The rate of business startups can be influenced by the business cycle, regional economic conditions, tax and regulatory environment, availability and cost of capital, market growth and competitive structure of industry sectors .

Washington Compared Nationally and Selected States

Research and development intensity grew for all selected states and the nation as a whole from 2004 to 2008, as shown below. The greatest increase was in Massachusetts, which saw 38.6% growth. Washington State experienced the next strongest growth, at 16%.

Total R&D by State, 2000-2007 ($millions)

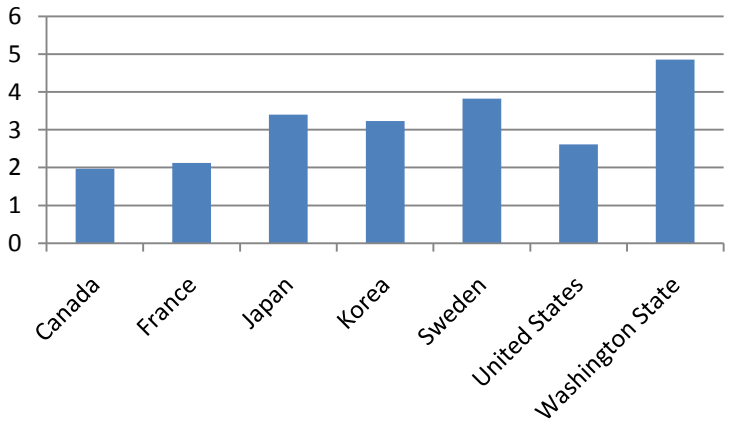


Source: National Science Foundation, 2004, 2008

Washington Compared to Other Nations

Washington State compares favorably in terms of R&D intensity to selected countries, with the highest level. The next greatest R&D intensity is Sweden, followed by Japan and Korea. The United States has a comparably low level of R&D intensity, though Canada and France have the least of these countries.

R&D Intensity Among Selected Countries, 2008



*note: New Zealand data was not available

Source: World Bank and AAAS, 2008

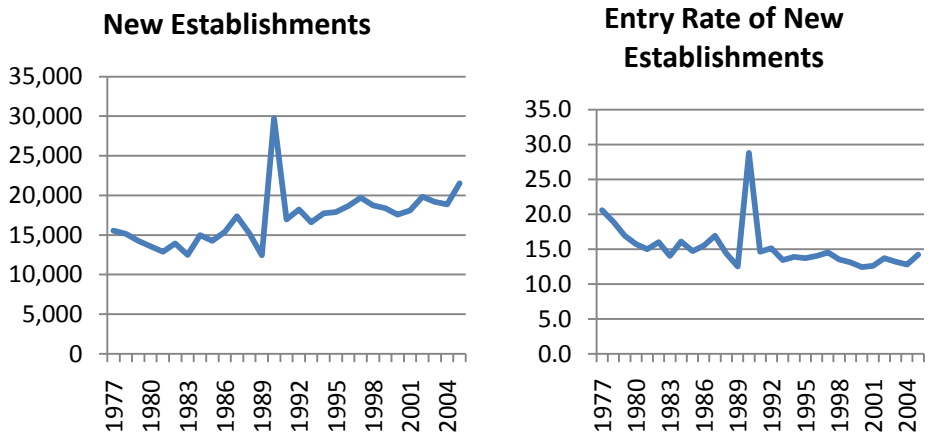
Business Startups

Trends in Washington

With the exception of a brief period in the early 1990s when the number of new businesses expanded greatly, Washington has exhibited a gently upward sloping trend in the number of new business startups over the past three decades. The past ten years has produced approximately 20,000 new business startups annually.

The entry rate of new establishments has also remained consistent over time, excluding the early 1990s. This measure has remained relatively constant, with new establishments representing approximately 15 percent of overall establishments over the past two decades.

Washington State Business Startups, 1977-2005



Source: U.S. Census

Metric Description

Business startup activity is the measure of new firm and establishment creation in the economy.

Importance

Business startups are an important indicator of economic vitality. When comparisons are made across peer groups of states, it can also be an indication of business climate and regulatory efficiency.

Data Sources and Quality

The primary source of state level business startup data in the United States are the Business Dynamics Statistics of the U.S. Census Bureau. Data from the World Bank allow for the comparison of Washington State business startups with those in other countries. Because of the lag in U.S. data, measures more recent than 2005 are available for only some of the peer countries below.

Determinants

The rate of business startups can be influenced by the business cycle, regional economic conditions, tax and regulatory environment, availability and cost of capital, market growth and competitive structure of industry

Washington Compared Nationally and Peer States

Compared to peer states, Washington has a competitive level of new business startups and job growth attributable to those new businesses. However, when compared to the United States as a whole, Washington's level of new business startups is much higher than the national average. The level of job creation associated with those new establishments is not much higher than the national average, however.

Business Startups by State

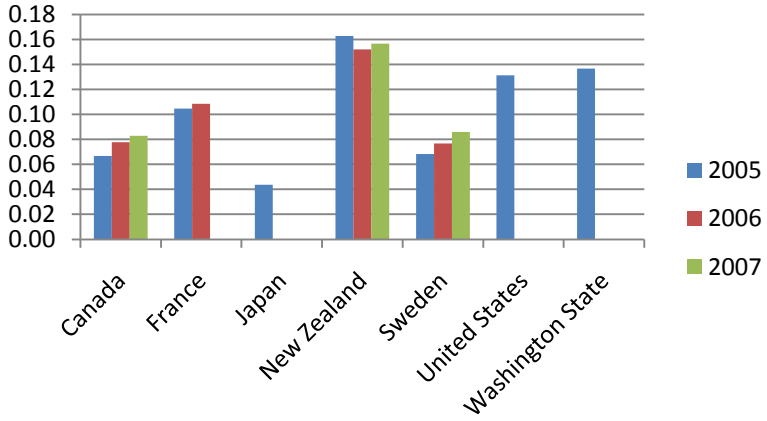
	New Establishments	Establishment _Entry_Rate (%)	Job Creation Rate Births (%)
California	752,061	14.0	7.3
Colorado	129,048	14.6	7.3
Connecticut	83,325	10.7	6.9
Massachusetts	156,060	10.6	5.0
Virginia	172,352	12.4	5.9
Washington	153,751	14.2	6.6
U.S.	6,656,400	12.6	6.5

Source: Census, Business Dynamics Statistics, 2005

Washington Compared to Other Nations

The 2005 business startup rates for Washington State and the United States (13 percent) as a whole are quite competitive with others from that year, with only New Zealand having a higher rate among these countries. Exceedingly low rates are seen in Japan and Sweden, with France and Canada showing moderate levels of new business startups. After 2005, increases in new establishment formation were seen in Canada, France, and Sweden, while they fell in New Zealand.

Business Startup Rates, 2005-2007

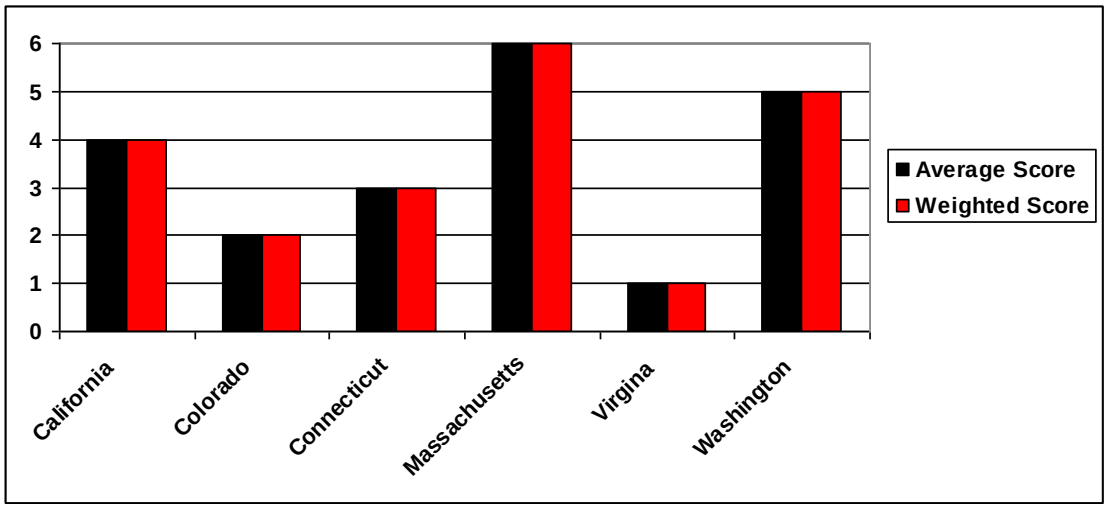


Source: World Bank, Source: Census, Business Dynamics Statistics, 1977-2005

Infrastructure

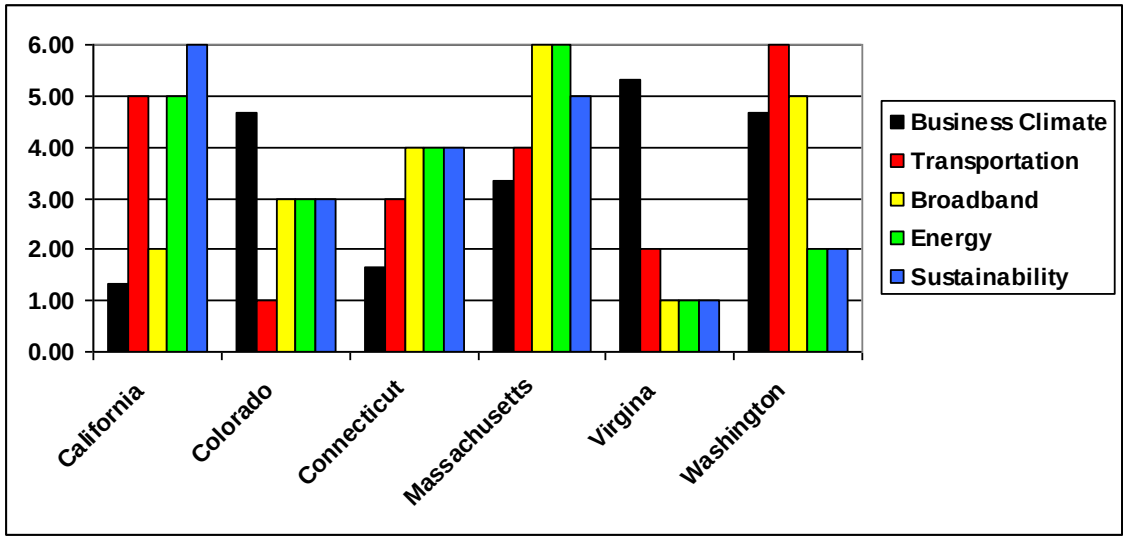
The infrastructure indicator was based on five dimensions: transportation, broadband, energy, business climate, and sustainability. Washington State scores relatively well on this measure, coming in second behind Massachusetts, as shown in Figure G.

Figure G Composite Scores for Infrastructure Indicators



Washington's score on the infrastructure indicator is based on high scores on three of the five indicators: business climate, transportation, and broadband, as documented in Figure H. Washington fares less well on energy and sustainability.

Figure H Component Scores for Infrastructure Indicators

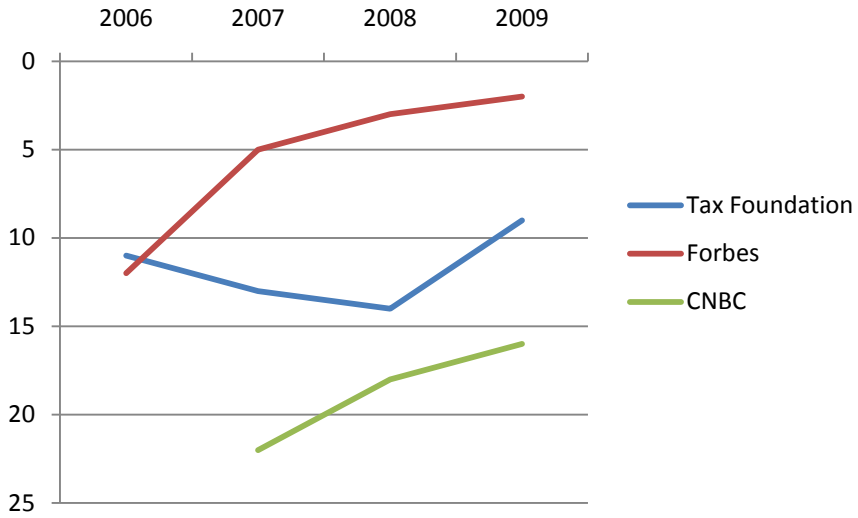


Business Climate

Trends in Washington

Washington State business climate rankings have climbed significantly over the past four years, as shown in the chart below. These increases have been most prominent in the Forbes rankings, where Washington grew from rankings in the low-teens to number 2.

Washington State Business Climate Rankings, 2006-2009



Source: Tax Foundation, Forbes, CNBC 2006-2009

Metric Description

Business climate refers to the host of factors that provide the context and support for the growth of businesses in regions.

Importance

Among the highly competitive regional economies in the United States, regions strive to have a business climate that attracts firms and employees. However, business climate indices must prioritize and weight factors in a manner that can make them have dramatically different results.

Data Sources and Quality

This fact sheet reports business climate rankings by a number of different sources.

Determinants

Construction of business climate indices involves prioritizing and weighing data across themes such as regulation, taxes, capital access, education, infrastructure, and innovation capacity.

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Washington Compared Nationally and Peer States

Numerous studies have been conducted comparing states in terms of their business climates. These are summarized and shown in the table below. Note the sometimes dramatic differences among the studies, with Massachusetts ranking 8th in the CNBC study and much lower in both the Tax Foundation and Forbes studies. Washington held excellent rankings relative to both peer states and the nation as a whole in each study, including the top ranking among the peer group in the Tax Foundation study and the 2nd ranking in the Forbes study. Virginia performed best overall among peer states, with 1st rankings in both the Forbes and CNBC business climate rankings.

Business Climate Ratings by State

	Tax Foundation (2010)	Forbes (2009)	CNBC (2009)
California	48	38	32
Colorado	13	4	3
Connecticut	38	35	35
Massachusetts	36	34	8
Virginia	15	1	1
Washington	9	2	16

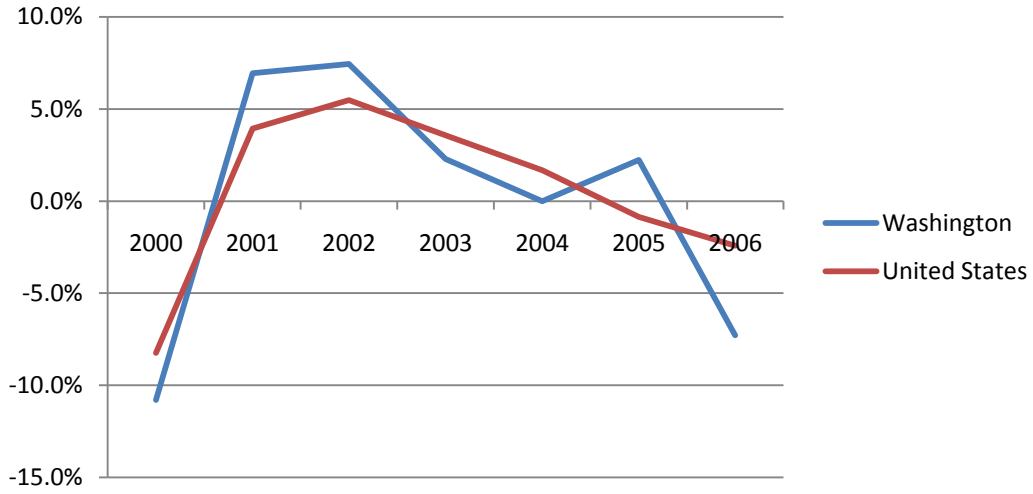
Source: Tax Foundation, Forbes, CNBC

Inward Investment

Trends in Washington

The long-range trend in employment tied to FDI has been down since 1999-2000. After a huge run-up in FDI employment from 1999 to 2000, Washington experienced five consecutive decreases until very strong growth from 2005 to 2006. However, this increase still leaves FDI employment in Washington below 1999 levels. The data for Washington closely matches that of the United States as a whole, indicating that macroeconomic trends are likely the principle causes of the stagnant-to-declining nature of employment tied to FDI.

Washington State FDI Employment Annual Change, 1999-2006



Source: BEA, Survey of Current Business, 1999-2006

Metric Description

Inward investment is another term for foreign direct investment, or FDI. FDI be either physical (the construction of plants, facilities, and employment) or through ownership stakes in companies with an existing presence in a region.

Importance

High levels of foreign direct investment indicate an economy that is strongly tied in with other regions in the global economy. FDI at the state level refers to the level of either physical or capital investment in a state by foreign firms. This investment is often referenced by the level of employment attributed to FDI.

Data Sources and Quality

The Bureau of Economic Analysis measures the nature and level of FDI among U.S. States as part of the Survey of Current Business.

Determinants

The level of FDI in an economy is a reflection of the relative attractiveness of that region for capital inflows. However, FDI is extremely sensitive to macroeconomic factors, such as differences in exchange rates and cost of capital across regions.

Washington Compared Nationally and Peer States

Compared to the peer states, Washington has a far lower share of FDI across industries. Connecticut and Massachusetts have the highest levels, with 5% of employment tied to FDI, while Washington has the lowest share among peer states, with only 2.85% of employment attributed to FDI. No international ratings are available on this metric.

Foreign Direct Investment by State

	Total Employment	FDI Employment	FDI Emp % Share
Washington	3,156,393	90,100	2.85%
California	16,290,343	605,600	3.72%
Connecticut	1,765,267	99,000	5.61%
Colorado	2,452,705	81,200	3.31%
Massachusetts	3,400,104	178,400	5.25%
Virginia	4,677,270	157,000	3.36%
United States	143,499,000	5,519,500	3.85%

Source: BEA, Survey of Current Business, 2007

The distribution of FDI employment across sectors of the economy varies widely. Washington State has a large share of Information, Wholesale, and Manufacturing FDI employment, with much lower shares of Retail, Finance/Insurance and Real Estate FDI employment, as shown below.

Foreign Direct Investment by State and Sector

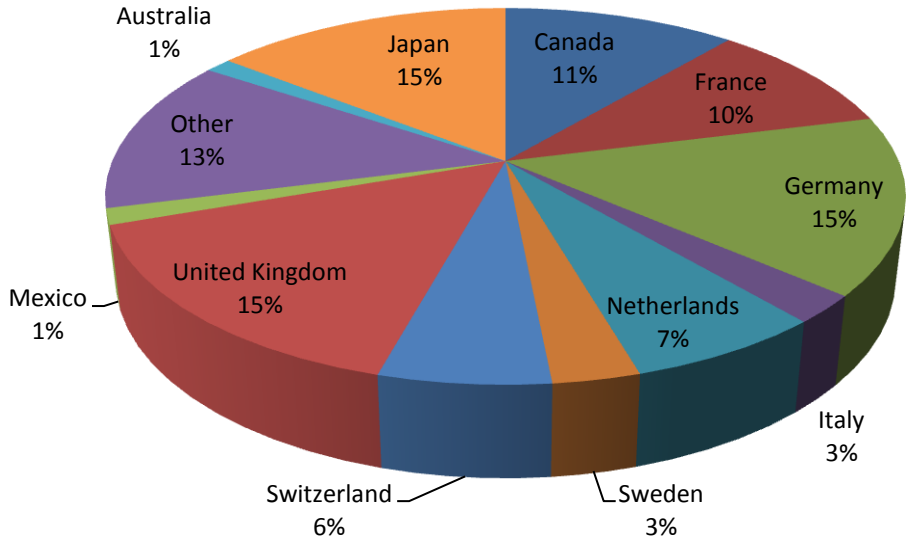
	Manufacturing	Wholesale	Retail	Information	Finance/ Insurance	Real Estate	Professional/ Technical	Other
Washington	33.9%	16.0%	3.8%	9.4%	2.0%	0.6%	4.4%	29.9%
California	31.6%	16.1%	5.5%	4.4%	7.9%	0.7%	4.5%	29.3%
Connecticut	35.9%	8.9%	18.8%	2.3%	12.1%	0.1%	3.8%	18.0%
Colorado	33.1%	13.2%	4.9%	6.9%	10.1%	0.2%	3.3%	28.2%
Massachusetts	24.4%	7.5%	20.7%	6.4%	12.4%	0.1%	6.6%	22.0%
Virginia	26.4%	12.7%	25.0%	3.5%	2.6%	0.5%	5.9%	23.4%
United States	36.2%	11.2%	9.7%	4.3%	6.9%	0.6%	4.2%	26.9%

Source: BEA, Survey of Current Business, 2007

Washington Relationship to Other Nations

The Survey of Current Business data from the Bureau of Economic analysis also allow for the examination of linkages between Washington State and other economies. The pie chart below shows the contribution of FDI employment for various countries for 2006. As shown below, Washington State has a relatively balanced share of FDI distributed across many countries. The United Kingdom, Japan, and Germany are the largest sources of FDI employment in Washington State, followed by Canada and France.

Washington State Foreign FDI Employment Share, 2006



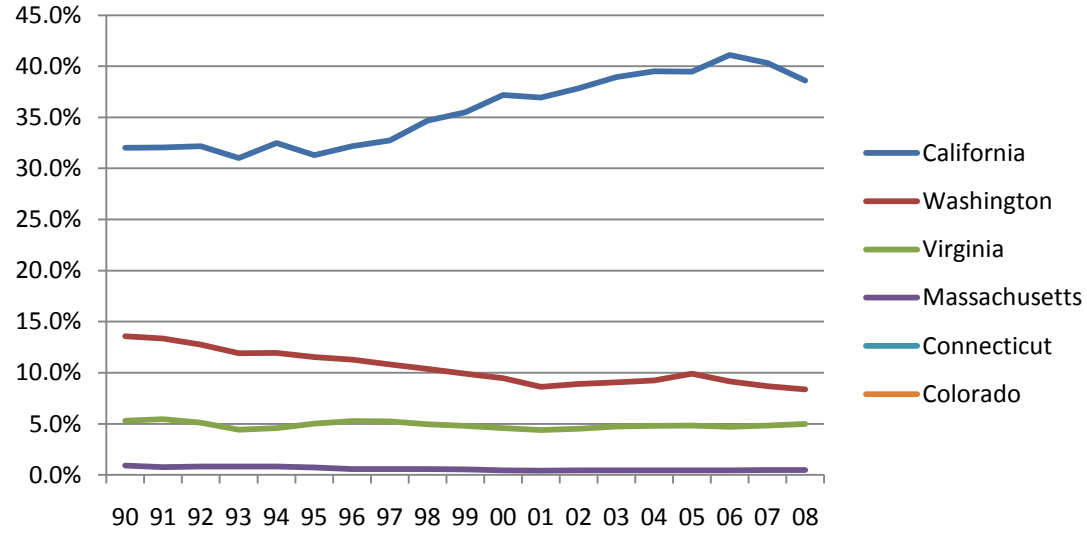
Source: BEA, Survey of Current Business, 2006

Infrastructure Transportation

Trends in Washington

Washington State has nearly continually seen declines in relative share of TEU (tonnage equivalent units) to other major container ports in the United States. Most of the loss has come to California, which has expanded its advantage to account for nearly 40 percent of all TEUs in the United States.

Change in U.S. Container Port Tonnage, 1990-2008



Source: AAPA, 1990-2008

Metric Description

Transportation data capture the role of ports in moving goods to, from, and through an economy.

Importance

High levels of trade, both for intermediate and final demand, are an indicator of global economic linkages. Regions with high levels of port activity also frequently exhibit higher relative concentrations of FDI than other regions.

Data Sources and Quality

The Bureau of Transportation Statistics Commodity Flow Survey is used for State-level commodity data. The American Association of Ports is utilized for specific port activity data.

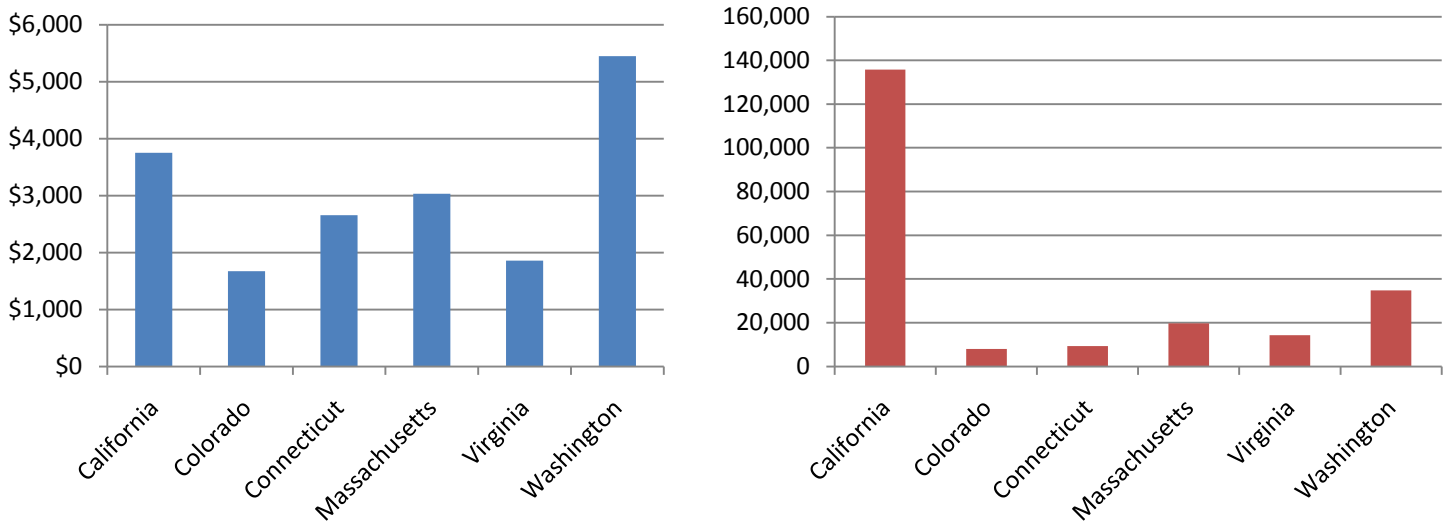
Determinants

Characteristics of demand for global goods, built infrastructure, and natural advantages (such as deep water draft ports) are all key determinants of the level and type of commodity flows and shipping activity.

Washington Compared Nationally and Peer States

The figure below shows the absolute and per capita value of commodity flows through peer states for 2007. This measure includes all types of ports and modes of transit. Although California exhibits an absolute level of value far exceeding that of the other peer states, Washington State is notably far higher in per capita value than any of the other selected states.

Per Capita and Absolute Values of Commodity Flows by State, 2007



Source: Bureau of Transportation Statistics, Commodity Flow Data, 2007

Washington Compared to Other Nations

Washington ports, when compared with those around the world, are quite competitive. Port rankings for selected countries are shown below. Korea, Japan, and the United States have the highest ranked ports, with those in New Zealand, Sweden, and France having much lower levels of TEUs. Key Washington State ports of Tacoma (62nd) and Seattle (70th) are much larger than those in New Zealand, Sweden, and France.

World Port Rankings (TEUs) for Ports in Selected Countries, 2008

RANK	PORT	COUNTRY	TEUS
6	Busan	South Korea	13,445,693
16	Los Angeles	US	7,849,985
17	Long Beach	US	6,350,125
20	New York/New Jersey	US	5,265,058
26	Tokyo	Japan	3,727,300
37	Nagoya	Japan	2,816,827
40	Savannah	US	2,616,126
42	Kobe	Japan	2,556,584
43	Metro Port Vancouver (BC)	Canada	2,492,107
47	Oakland	US	2,236,244
53	Hampton Roads	US	2,083,278
61	Osaka	Japan	1,950,083
62	Tacoma	US	1,861,352
65	Kwangyang	South Korea	1,810,164
66	Houston	US	1,795,320
68	Inchon	South Korea	1,770,884
70	Seattle	US	1,704,492
71	San Juan (FY)	US	1,684,883
72	Charleston	US	1,635,534
74	Montreal	Canada	1,473,914
93	Honolulu (FY)	US	1,124,388
96	Port Everglades (FY)	US	985,095
105	Gothenburg	Sweden	862,595

108	Auckland	New Zealand	840,000
110	Miami (FY)	US	828,349
112	Marseilles	France	826,023
113	Hakata	Japan	824,532
120	Jacksonville	US	697,494

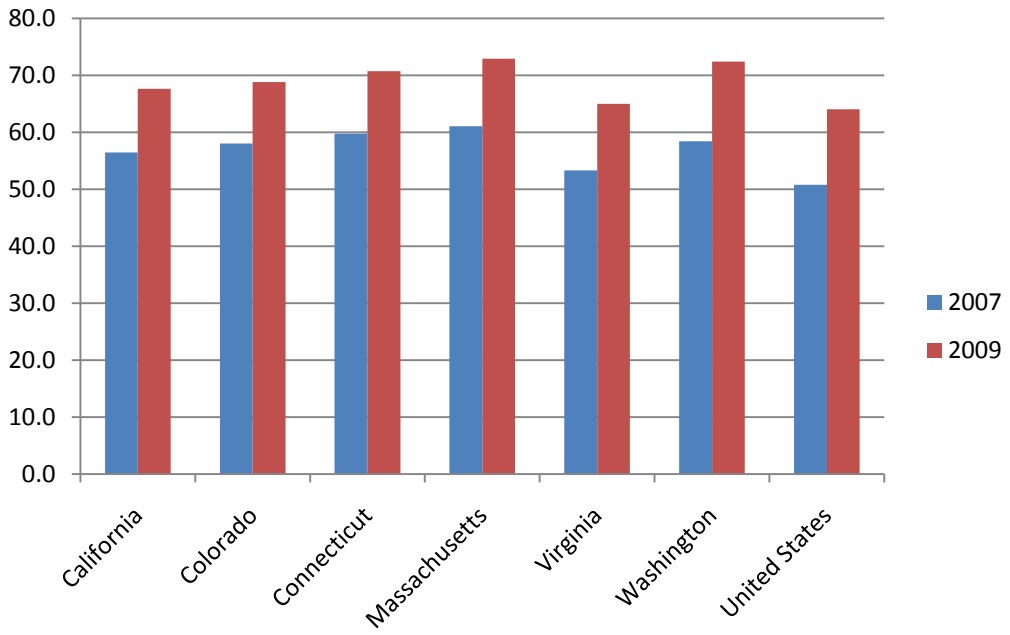
Source: AAPA, 2008

Broadband

Trends in Washington

Broadband utilization has expanded rapidly throughout the United States, and Washington State has participated in that trend. The figure below shows the change in broadband utilization for peer states from 2007 to 2009. Among peer states, Washington's growth in broadband access has been the greatest, with a 24% increase.

Broadband Utilization for Select States: 2007 and 2009



Source: United States Current Population Survey, 2007 and 2009

Metric Description

Broadband utilization is a measure of the usage of high speed internet access.

Importance

The availability of broadband, otherwise known as high-speed internet access, is considered an important part of regional economic development infrastructure. The availability of broadband allows for higher business productivity and is a pre-requisite for many industries, including business services and technology. It can enhance availability and utilization of flexible work arrangements and reduce environmental impacts of peak commuting arrangements.

Data Sources and Quality

The most complete source of this data at the U.S. level is the Current Population Survey of the United States Census. Internationally, the OECD offers timely broadband penetration data.

Determinants

The availability of broadband internet access and consumer adoption are the determinants of broadband utilization.

Washington Compared Nationally and Peer States

Compared to other states within the United States, Washington has an extremely high percentage of household broadband usage, with a utilization rate only lower to that of Massachusetts. Washington also has a far higher level of broadband usage than the United States as a whole.

Broadband Utilization by State

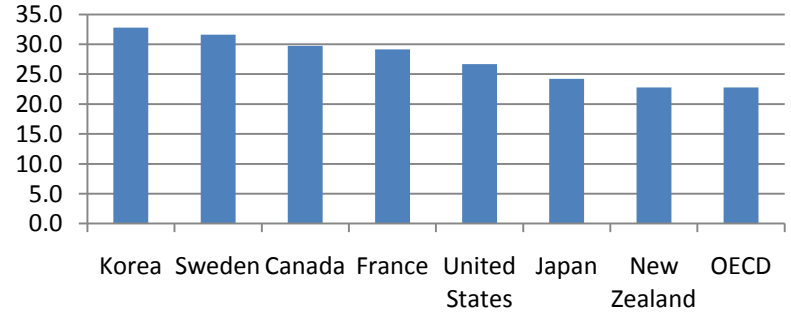
State	Broadband Utilization % 2009
Massachusetts	72.9
Washington	72.4
Connecticut	70.7
Colorado	68.8
California	67.6
Virginia	65.0
United States	64.0

Source: United States Current Population Survey, 2009

Washington Compared to Other Nations

The 2005 business startup rates for Washington State and the United States (13 percent) as a whole are quite competitive with others from that year, with only New Zealand having a higher rate among these countries. Exceedingly low rates are seen in Japan and Sweden, with France and Canada showing moderate levels of new business startups. After 2005, increases in new establishment formation were seen in Canada, France, and Sweden, while they fell in New Zealand.

Broadband Subscribers per 100 inhabitants, 2009



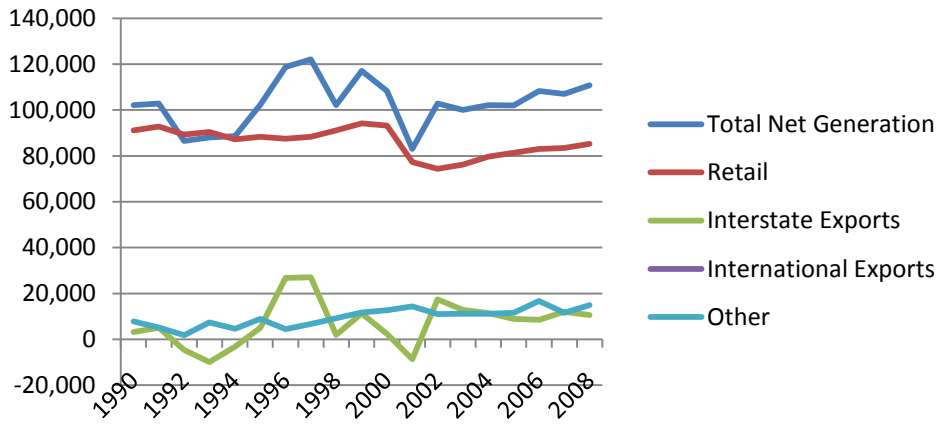
Source: OECD, 2009

Energy

Trends in Washington

Electricity production in Washington State has remained stable over the past three decades. However, there has been an increase over time in the share of electricity production that is sold to both international and inter-state users, which have taken some share away from local retail sales.

Washington State Electricity Production by Disposition, 1990-2008



Source: United States Energy Information Administration, 1990-2008

Washington Compared Nationally and Peer States

Washington State provides one-fourth of the total hydroelectric power produced in the United States, and serves as the chief petroleum refining State in the Pacific Northwest. The table below shows the level of energy production and consumption, and gives a ratio of consumption to production. A ratio of 1 would indicate a perfect balance between production and consumption. Values below 1 are indicative of production that exceeds consumption. As shown below, Washington relies upon imports to satisfy half of energy use, which is above the national average. Colorado is the only of the peer states that produces more energy than it uses. Connecticut and Massachusetts rely upon imports for the vast majority of their energy consumption.

\

Metric Description

Energy production and consumption trends and characteristics across regions are presented in this fact sheet.

Importance

Energy is demanded by all sectors and key export for regions rich in natural energy resources.

Data Sources and Quality

Energy data is available through the United States Energy Information Administration. International energy data is available from the International Energy Agency.

Determinants

The supply and demand for energy is variable and is strongly related to the overall level of economic activity and the supply of energy resources.

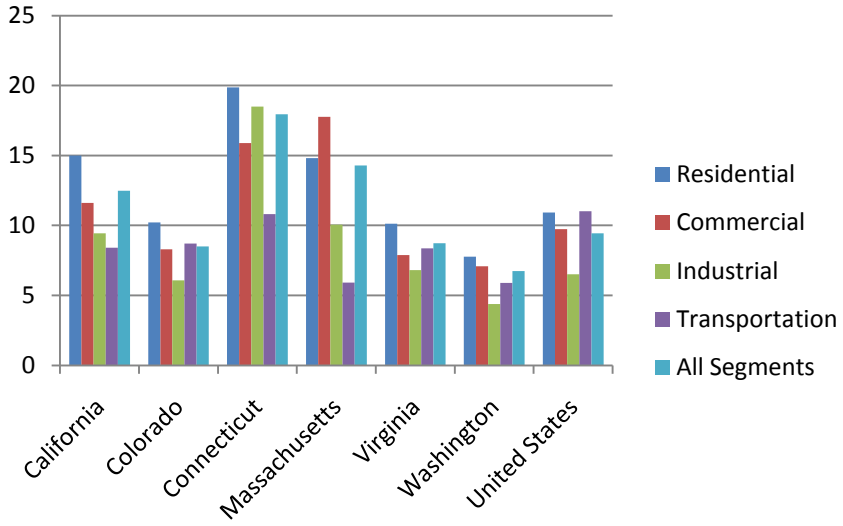
Selected Peer States Energy Production and Consumption, 2009 (trillions btu)

	Energy Production	Energy Consumption	Consumption/ Production Ratio
California	2898	8491	2.9
Colorado	2335	1479	0.6
Connecticut	199	870	4.4
Massachusetts	97	1514	15.6
Virginia	1173	2610	2.2
Washington	971	2067	2.1
United States	71353	101468	1.4

Source: Energy Information Administration, 2009

Due in large part to rich sources of hydroelectric power and strong public local and regional utility districts, Washington State has by far the lowest prices to a wide variety of users, as shown in the chart below. Across all customers, the average price per kWh for Washington State is 6.74 cents, which is 26 percent cheaper than Virginia, which has the second lowest cost. Northeastern states of Connecticut and Massachusetts have the highest costs.

Electricity Prices for Selected States (per kWh), 2009



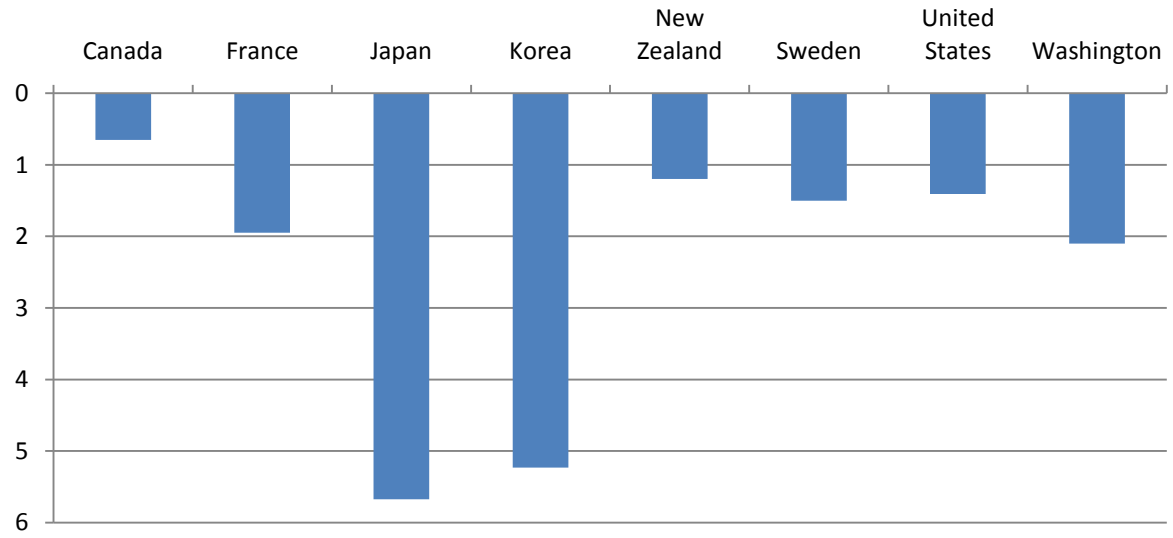
Source: United States Energy Information Administration, 2009

Washington Compared to Other Nations

International data is provided by the International Energy Agency, which allows for a comparison of Washington and the United States energy use and production with other countries.

The IEA data shows that the United States and Washington State have moderate production to consumption ratios when compared with other peer countries. Canada is a major net exporter of energy, followed by New Zealand, the United States, and Sweden. Japan and Korea are heavy net importers of energy, with each producing only approximately 15 percent of energy consumed.

Production to Consumption Ratios for Washington State and Countries, 2009



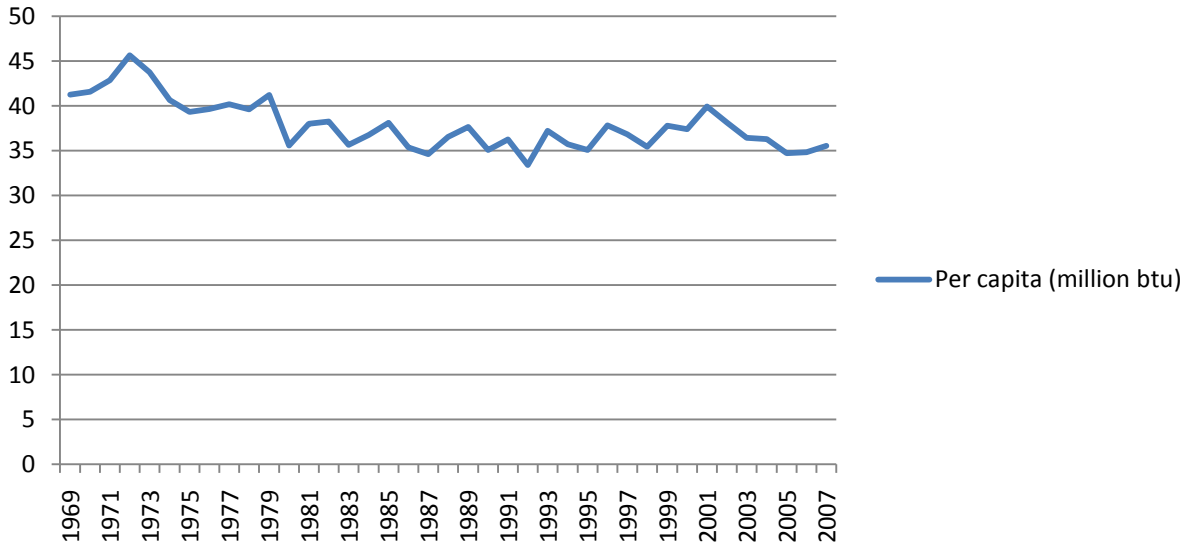
Source: International Energy Agency, 2009

Sustainability

Trends in Washington

The overall trend in per capita residential energy consumption in Washington State is down. Reductions were most significant during the 1970s, when per capita consumption fell from 40 to 35 million btu. Since 1980, energy use per capita by the residential sector has leveled off, changing slightly on an annual basis but remaining near 35 million btu per capita.

Washington State Residential Per Capita Energy Consumption, 1969-2007



Source: Energy Information Administration, Bureau of Economic Analysis 1969-2007

Washington Compared Nationally and Peer States

Metric Description

A key component of sustainability is resource use. These metrics track resource utilization in Washington and other states and countries.

Importance

Sustainability is increasingly recognized as an important part of long-run environmental and economic outcomes.

Data Sources and Quality

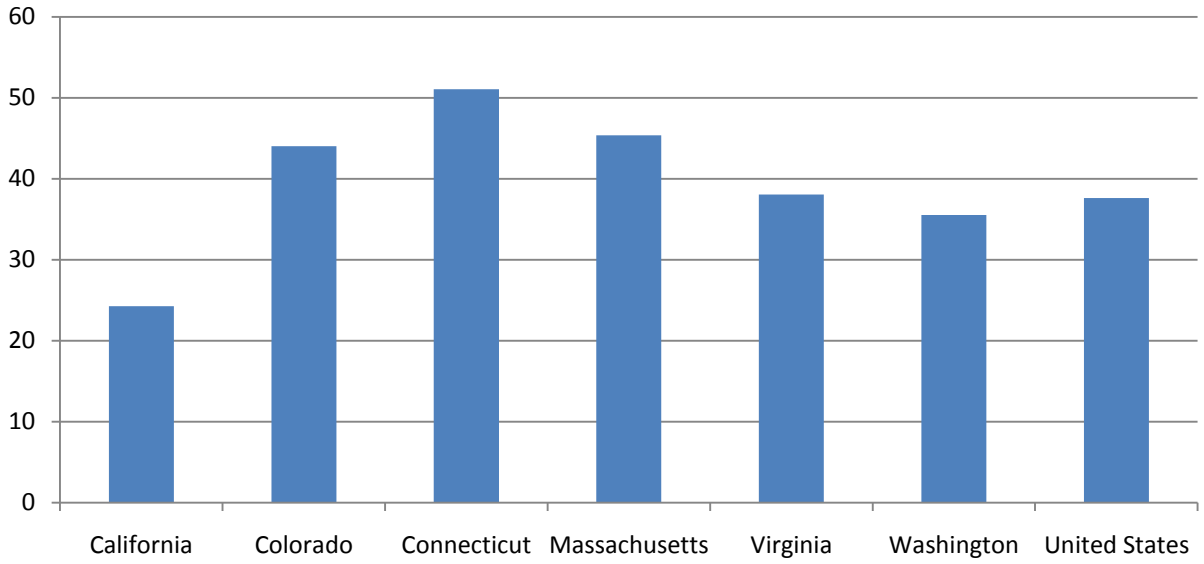
Energy use data is from the Energy Information Agency.

Determinants

The level of energy consumption depends on many factors, such as household and industrial demand. However, the level of efficiency in the operation of homes and plants also plays a pivotal role in energy usage.

Washington State has a relatively low level of per capita residential energy consumption relative to peer states. Only California has a lower level of energy use, while Connecticut, Massachusetts, and Colorado exhibit levels of energy usage far higher than the United States as a whole. Washington is slightly below the national average, while Virginia is just slightly above the national average.

Per Capita Residential Energy Consumption for Selected States, 2007

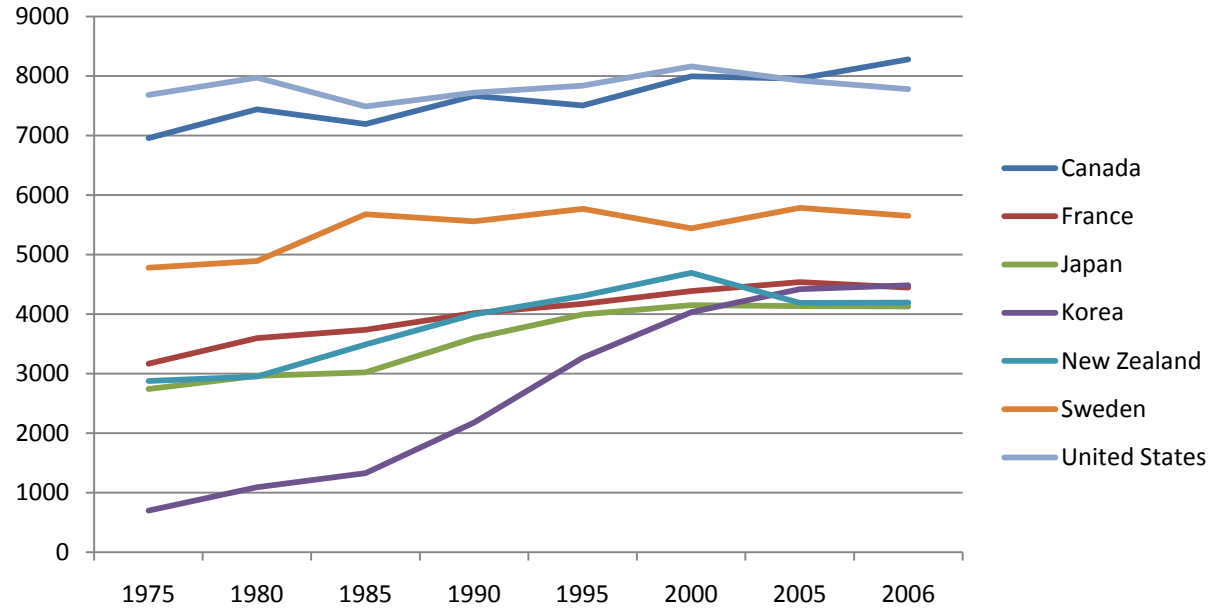


Source: Energy Information Administration, 2007

Washington Compared to Other Nations

Although there is a lack of commensurate data to compare Washington State with other countries in the World Bank data, because of the EIA data shown above it is apparent that Washington's energy use per capita is largely commensurate with that of the United States as a whole. Below, U.S. and other selected country data are shown for per capita energy consumption (in oil barrel equivalent units). Note the relatively high per capita consumption levels of the United States and Canada relative to other countries. Also of note is the tremendous rise in Korea (though leveling off since 2000), which has coincided with the rapid surge in economic growth in Korea over this time period.

Per Capita Energy Consumption for Selected Countries, 1970-2006



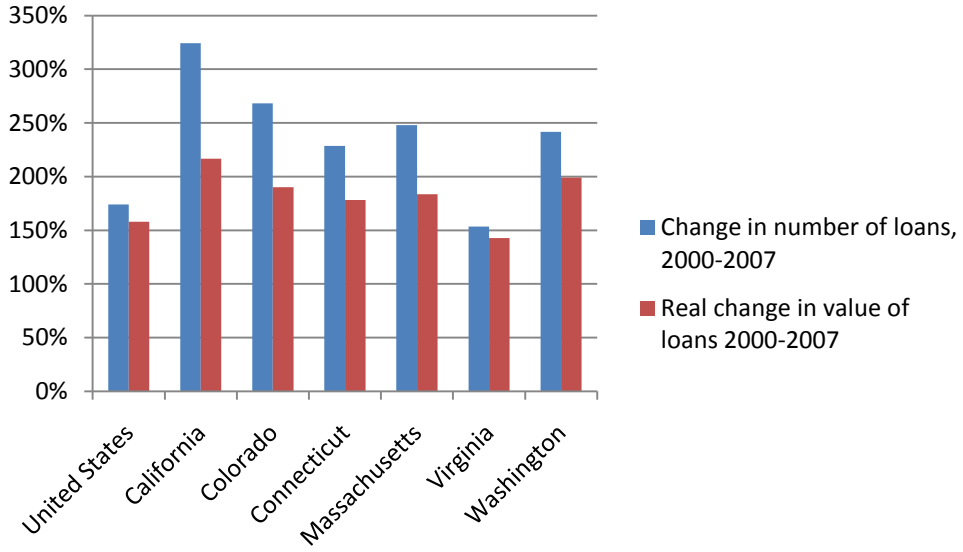
Source: World Bank, 1975-2006

Capital Access

Trends in Washington

Washington experienced a trend of the increase of dollar value and number of small business loans over the 2000-2007 time period. Both measures have exceeded that of the national level, and of the peer states only California has experienced greater increases in both measures.

Change in number and dollar value of small business loans, 2000-2007



Source: CRA, 2000, 2007

Washington Compared Nationally and Peer States

As shown below, in comparison with other peer states in the United States, Washington has a very high level of overall employment from small businesses but a very low level of capital availability for those businesses.

Metric Description

Capital access is the means by which businesses acquire funding for new investment and operating resources.

Importance

The availability of capital is vitally important to prospective and current businesses and is an important indicator of both business climate and entrepreneurial capabilities of a region. It is an important part of entrepreneurship, allowing firms to obtain initial financing to commence operations and for growth. Local capital availability is also particularly important to small and medium sized businesses, which frequently utilize local and regional lending institutions and financial intermediaries for their access to investment and operating capital.

Data Sources and Quality

The source of data utilized for this work on capital access is the CRA, or Community Reinvestment Act. A requirement of the Act was the collection and distribution of data pertaining to capital availability for small businesses across regions in the United States.

Small Business Characteristics by State

	Number of small firms	Percent of employment by small firms	CRA loans/small business	Value of loans ($million)
California	718,220	52.10%	3.67%	$2,203,725
Colorado	126,951	51.70%	2.62%	$278,393
Connecticut	75,626	49.60%	2.25%	$173,802
Massachusetts	141,961	48.30%	2.00%	$296,410
Virginia	153,033	49.40%	1.91%	$280,784
Washington	147,948	55.70%	2.11%	$280,522
United States	6,000,000	50.20%	2.37%	$12,786,987

Source: CRA, 2007

Washington Compared to Other Nations

Lacking an international measure of credit access commensurate with that provided by the CRA data, World Bank rankings on capital access is shown below for the peer countries. The World Bank ranking methodology on capital access led to many ties, some of which are reflected below. New Zealand and the United States ranked highest of the peer countries, tied for 4th position. Japan and Korea followed tied for 15th, while Canada, France, and Sweden lagged in the capital access rankings.

World Bank Capital Access Ranking for Selected Countries, 2010

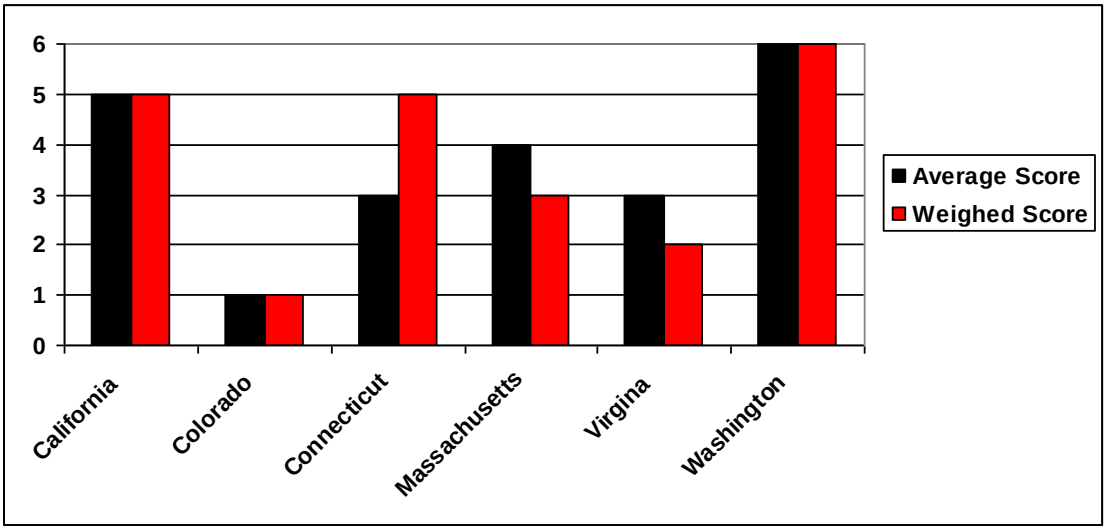
Country	Credit Access Ranking (n=183)
New Zealand	4
United States	4
Japan	15
Korea, Rep.	15
Canada	30
France	43
Sweden	71

Source: World Bank Doing Business Rankings, 2010

Business Performance

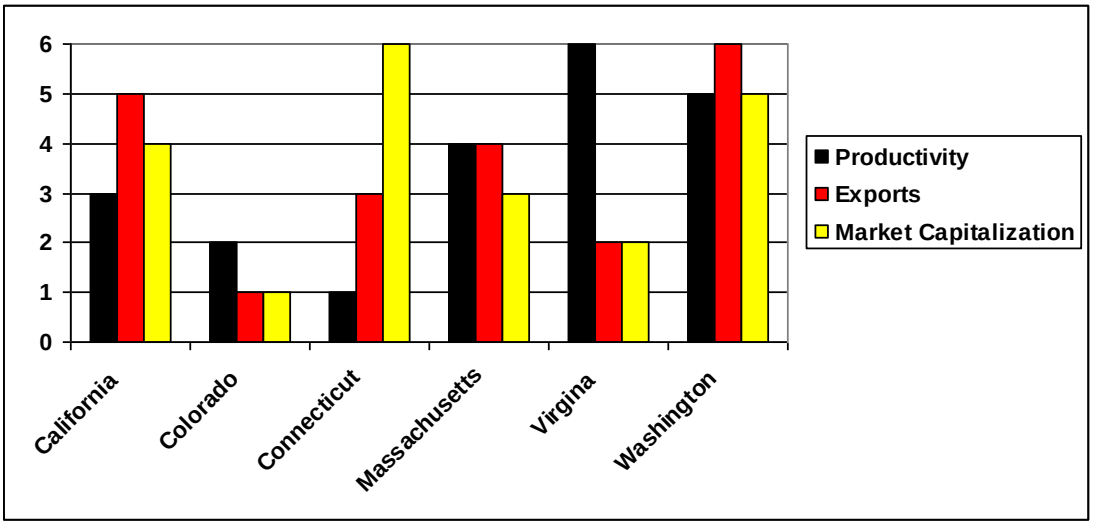
Business performance was measured by three indicators: productivity, exports, and market capitalization. We were unable to develop measures of new products and services or profitability. Figure I reports that Washington scores highly on this measure, while Figure J reports Washington's performance on the three underlying indicators.

Figure I Composite Scores for Business Performance



Washington's top position on this indicator is broad-based, with a high score on exports, and very good position on market capitalization and productivity, as reported in Figure J.

Figure J Scores for components of the Business Performance indicator

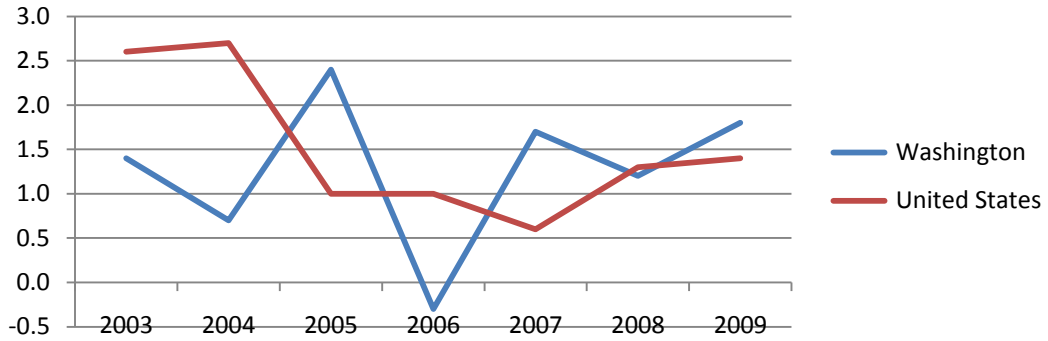


Business Performance Productivity

Trends in Washington

Real non-farm productivity has trended slightly positive from 2003-2009. It was higher each year except in 2006, when it fell slightly.

Washington State and national change in real non-farm productivity, 2003-2009



Source: BEA and FRBSF, 2003-2009

Metric Description

Productivity is a measure of production efficiency in a regional economy.

Importance

Productivity gains in an economy indicate that more output is being generated with less factor investment.

Data Sources and Quality

The source of data utilized for this work is the Bureau of Economic Analysis and Federal Reserve Board of San Francisco for state data. Although there is no direct measure of state productivity, the FRBSF makes estimates for real non-farm productivity change. International data is from the Bureau of Labor Statistics.

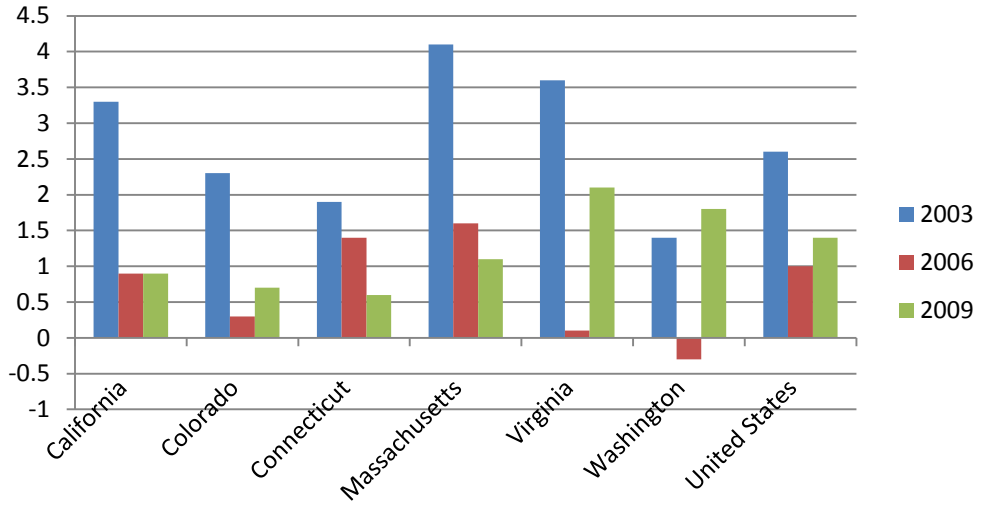
Determinants

The numerator of productivity change is output, while the denominator is hours worked. Productivity figures are influenced by changes in either measure. Productivity data can be problematic, as decreases in hours worked can cause productivity to rise going into recessions. Likewise, productivity change can lag other economic indicators during expansions, as output grows faster than hiring during expansionary periods.

Washington Compared Nationally and Peer States

The chart below shows real non-farm productivity changes in Washington relative to peer states. During the expansion in 2003 and 2006, Washington lagged other peer states. However, during the downturn of 2009, Washington experienced stronger growth than all states except Virginia.

Real non-farm productivity by state, 2003-2009

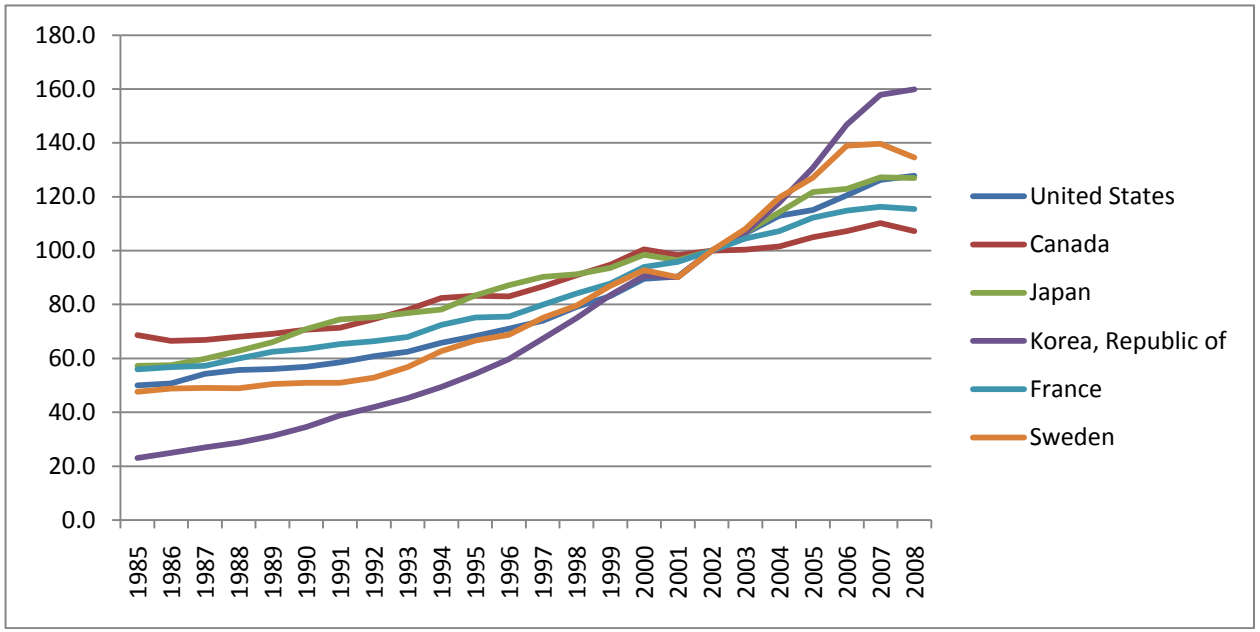


Source: BEA and FRBSF, 2003-2009

Washington Compared to Other Nations

As shown below, South Korea has had tremendous productivity gains over the 1985-2008 time period. The United States remained near the midpoint of productivity index change over this period, with Canada and France lagging the other peer countries.

Productivity change among selected countries, 1985-2008



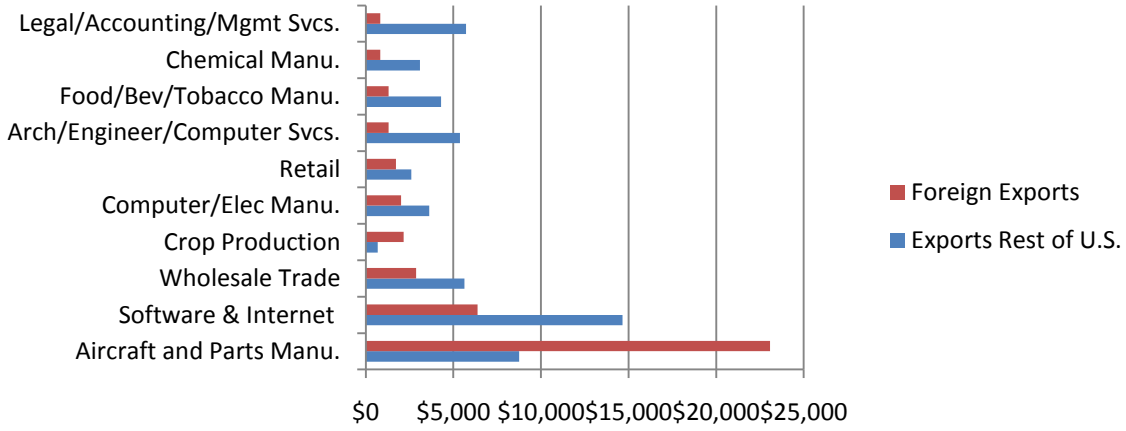
Source: Bureau of Labor Statistics, 1985-2008

Trends in Washington

The data for comparison among states below is based on WISER, which shows the level of goods exports. However, traditional state level export data such as WISER excludes services, which represent a significant share of Washington State exports. Because of the rich tradition of detailed input-output analysis in Washington State, input-output data for Washington only is available and presented here as a supplement to the goods export data shown below. The ten largest exporting industries are shown in the graph below. Note the high levels of exports in many service industries. Software and Internet, for example, generated over $5 billion in foreign exports, second only to Aircraft and Parts Manufacturing. Other strong export contributions from service industries unaccounted for in the WISER data are Retail, Architectural/Engineering/Computer Services, and Legal/Accounting/Management Services.

Also shown below is the level of exports to other states in the United States. In Washington State, service industries such as Software & Internet, Architecture/Engineering/Computer, and Legal/Accounting/Management in Washington State export far more to other states than they do to foreign countries.

Washington State Foreign Exports by Industry, 2002 (data in $millions)



Source: 2002 Washington State Input-Output Analysis (Beyers and Lin)

Metric Description

Exports as a percentage of GDP is a commonly used comparative measure of export activity for an economy. Exports from this state to the rest of the United States are considered in this section as well as foreign exports.

Importance

Exports are the primary means of increasing income in a regional economy. They are especially important for small economies that lack the broad distribution of economic activities that characterize large, post-industrial economies.

Data Sources and Quality

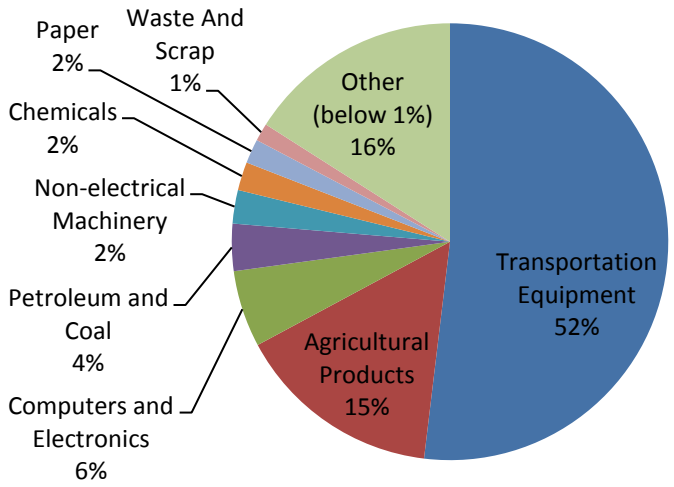
For state-level data, WISER data is used, as well as data from the Washington Input0Output Analysis. For global data, the World Bank export data is used.

Determinants

High levels of exports indicate demand for goods and services produced in a region. They are highly influenced by macroeconomic factors and by exchange rates.

According to WISER data, Washington State exports totaled $51.7 billion in 2009. The majority of these exports are in Transportation Equipment, with Aerospace exports accounting for the bulk of that amount. Agricultural products were the second most valuable export, followed by petroleum.

Washington State Exports, 2009



Source: WISER, 2009

There has been significant change in the composition of exports across industries in Washington State. The net change in export values was 28.5 percent. Tremendous growth agricultural products, petroleum, and waste and scrap exports was partially offset by significant declines in paper, forest, and wood products. Transportation equipment, of which aerospace is a primary component, was up only slightly.

Washington Compared Nationally and Peer States

Washington State has an exceedingly high level of exports to gross domestic (state) product when compared to both peer states and the United States as a whole. Among peer states, California ranks second, with a large gap to the other states. The other states have average to below average levels of exports relative to the United States as a whole.

Exports by State as Percent of GDP

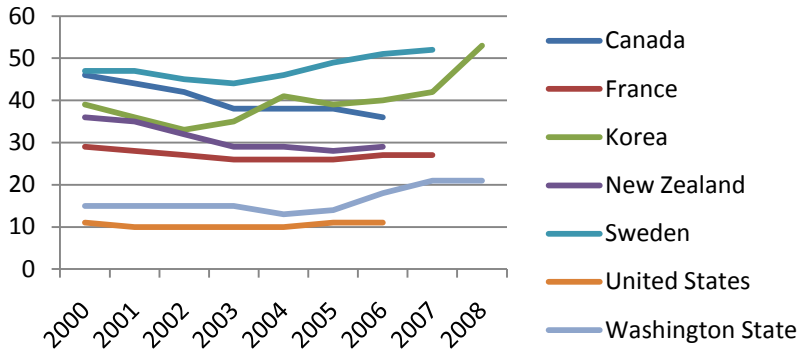
	% GDP
California	14.20%
Colorado	3.08%
Connecticut	7.08%
Massachusetts	7.75%
Virginia	4.77%
Washington	20.72%
United States	11.0%

Source: WISER, Bureau of Economic Analysis, 2008

Washington Compared to Other Nations

Both Washington State and the United States have very low levels of exports as a percentage of GDP, as shown below. Although Washington State has a far higher ratio than the U.S. as a whole, both are far below the levels of peer countries. Korea has had a recent surge in exports, giving it the highest ratio, at just over 50%. Sweden and Canada both have high ratios, though Canada has seen the level of exports relative to GDP fall significantly over the past few years.

Foreign Exports as a percentage of Gross Domestic Product, 2000-2008



Source: World Bank, 2000-2008, WISER, 2008 and BEA, 2008

Market Capitalization

Washington Compared Nationally and Peer States

Washington has a disproportionate amount of market capitalization for the size of the state GSP, as shown below. Only Connecticut, with a 1.99 market cap to GSP ratio, exceeded that of Washington, with a 1.39 ratio. Lagging among the selected states were Virginia, Colorado, and Massachusetts, which each had a ratio of less than 1.

Market Capitalization (30 largest public companies) and GSP ratios

	Top 30 Market Cap	Market Cap/GSP
California	$1.98 T	1.07
Colorado	$120 B	0.48
Connecticut	$431 B	1.99
Massachusetts	$287 B	0.79
Virginia	$213 B	0.54
Washington	$447 B	1.39

Source: Securities and Exchange Commission, Bureau of Economic Analysis, authors' calculations

Washington Compared to Other Nations

World Bank data provided market capitalization to GDP ratios for selected countries. A value of 100 would represent equivalent market cap to GDP. The United States had the highest level, with an index value of just over 80. Canada and Japan also had high values, while New Zealand, without a large stock market index, lagged significantly relative to peer countries. Note the much higher value of Washington State, which has an index of greater than 100. This is in large part due to the presence of very large publicly traded firm Microsoft, which accounts for more than half of the market capitalization of the 30 largest publicly traded corporations located in the state.

Metric Description

Market capitalization as a share of GDP is a commonly used measure of the valuation of public company earning streams.

Importance

Market capitalization is a stock, or yardstick, measure of factor valuation in an economy. A high market capitalization to GDP ratio indicates optimism of the public markets for future growth of corporate earnings.

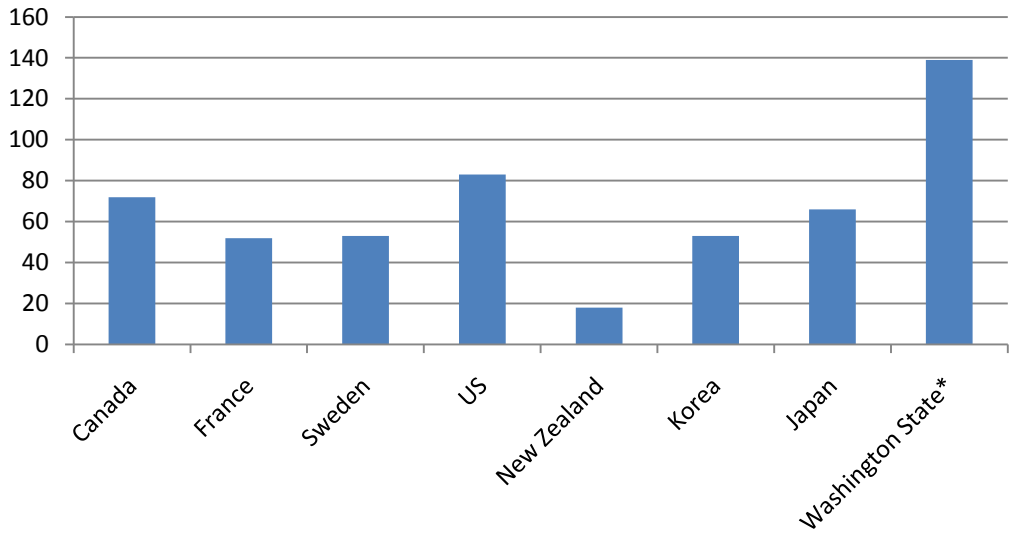
Data Sources and Quality

The World Bank data and authors' calculations from SEC data are used for market capitalization data.

Determinants

Macroeconomic factors are very important for this measure. The monetary supply has a tremendous impact on market capitalization ratios, as do currency imbalances across regions.

Market Capitalization to GDP ratios for Selected Countries and Washington State, 2008

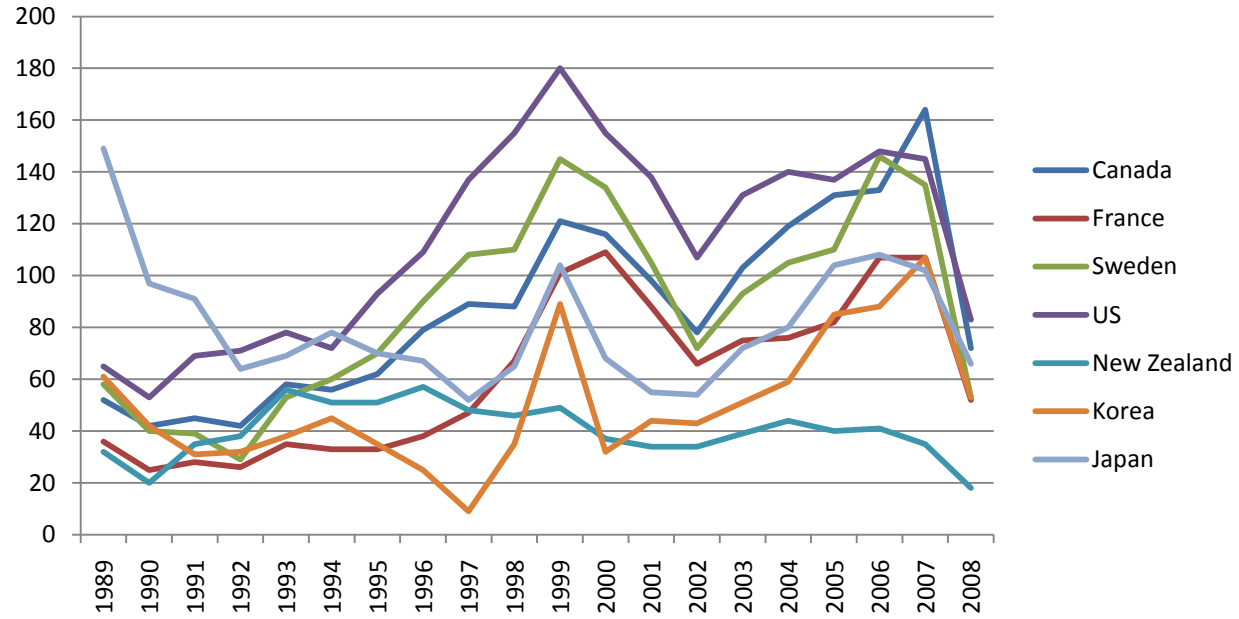


*note: the ratio for Washington State reflects 2010 market capitalization data

Source: World Bank, Bureau of Economic Analysis, Authors' Calculations

The figure below shows the change over time in market capitalization to GDP ratios. These relationships are highly volatile, as ratios adjust to changing sentiment on the part of capital market investors over time. The peak of the chart below reflects the height of the so-called tech bubble in the United States of the late 1990s, at which point the ratio hit a high of 180, or market capitalization of 1.8 times that of GDP. Recent years saw a return to below 100 in all of these selected countries.

Market Capitalization to GDP ratios for Selected Countries, 1989-2008



Source: World Bank, Bureau of Economic Analysis, Authors' Calculations

Public Impact

Public impact was evaluated through the use of five indicators: state GDP, employment growth, standard of living, income distribution, and state revenues. Figure K reports Washington has a relatively low position on this indicator.

Figure K Composite Scores for Public Impact Indicators

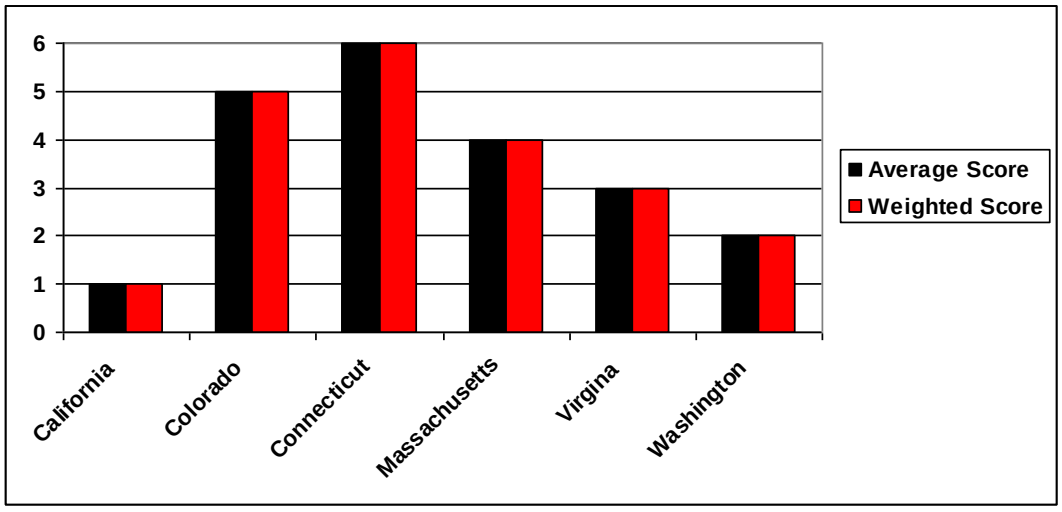
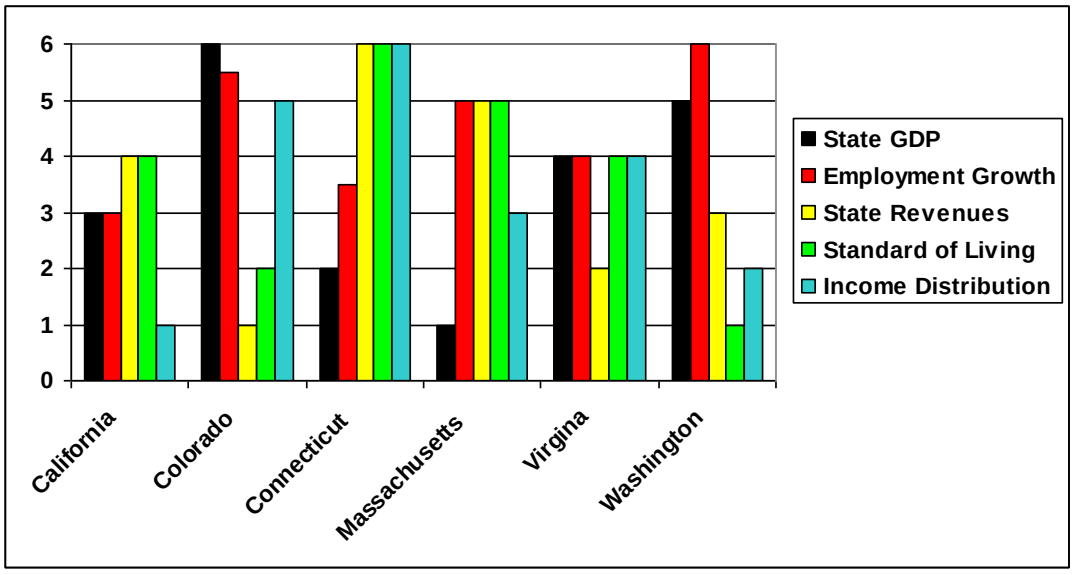


Figure L reports the scores of the component indicators for public impact. Washington has mixed scores on this dimension, with high scores on state GDP and employment growth, and lower scores on state revenues, income distribution, and standard of living.

Figure L Component Scores for Public Impact Indicators



Public Impact State GDP

Gross Domestic Product Growth

Trends in Washington

The pace of GDP growth varied considerably in Washington from 2001 to 2008, reflecting national business trends. The recession of 2000-1 is evident in the slow pace of growth in 2001. An economic recovery followed, with GDP growth topping out at 7.7 percent in 2005. By 2008, the onset of the "great recession" was evident, with the growth rate falling off to 4.0 percent, about half the pace at the peak of the business cycle.

Growth of GDP in Washington

	Growth Rate
2001	1.7%
2002	2.5%
2003	4.0%
2004	5.2%
2005	7.7%
2006	6.0%
2007	7.3%
2008	4.0%

Source: Bureau of Economic Analysis, U.S. Department of Commerce

Description

GDP growth is the most comprehensive measure of economic activity. GDP estimates represent the market value of all goods and services produced in a given year in a particular country or subdivision of a country such as a state.

Importance

Growth of GDP provides additional income to individuals, companies, and political jurisdictions. When GDP grows rapidly, many citizens will benefit through larger paychecks and other sources of income. Companies are likely to earn higher profits, allowing them to then invest in new technology and workforce development to enhance their future competitiveness.

Data Sources and Quality

Main source of GDP data is the Bureau of Economic Analysis, Department of Commerce. Quarterly GDP data is frequently revised. OECD is main source of international GDP comparisons.

Determinants

GDP growth rates depend on the business cycle and how well Washington companies perform in providing quality and cost competitive products and services.

Washington Compared Nationally and Peer States

GDP grew somewhat faster than the national average in Washington from 2007 to 2008. Colorado grew much more rapidly than the other peer states, and Washington came in second.

GDP Growth by State

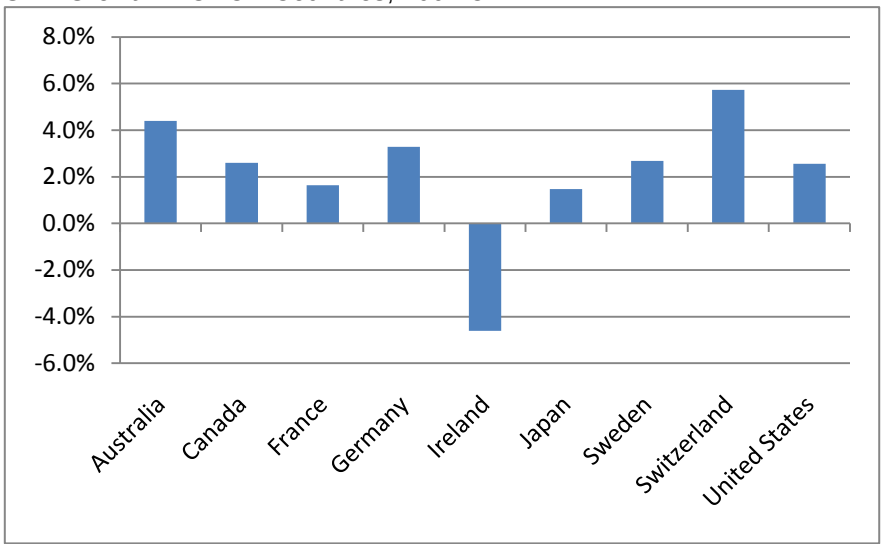
	GDP Growth, 2007-8
California	2.5%
Colorado	5.4%
Connecticut	1.8%
Massachusetts	1.5%
Virginia	3.4%
Washington	4.0%
U.S.	3.3%

Source: Bureau of Economic Analysis, U.S. Department of Commerce

Washington Compared Internationally

GDP growth in 2008 was modestly positive in 2008 in all of the OECD countries except Ireland, which experienced a substantial contraction. The growth rate in the US fell in the middle of this set of countries, lower than the rate of growth in Australia, Germany, Sweden, and Switzerland; about the same as in Canada; and higher than in France, Ireland and Japan. The rate of growth in Washington was higher t han in the U.S. comparable to the rates in Australia and Germany. These international comparisons are made using country GDP converted to US dollars using Purchasing Power Parity price indexes which control for the differences in the composition of consumer purchases in these different countries.

GDP Growth in OECD Countries, 2007-8



Source: Organization for Economic Cooperation and Development

Employment Growth

Trends in Washington

The growth of employment in Washington accelerated in the last decade, peaking in 2006 at a 3 percent rate. Wage growth also peaked in that year at 5.3 percent. Growth of employment averaged 1.3 percent in these years, a pace of expansion that is below what was achieved in Washington in prior decades. According to the state's Office of Financial Management, the average for the 1980s was 2.6 percent and for the 1990s it was 2.1%.[2] Wages fell by an average of 0.3 percent per year in the 1980s in Washington, followed by a 3.0 percent per year average growth in the 1990s. The average for 2002 through 2008 was 3.2 percent, a strong performance compared to the two prior decades. Thus employment grew relatively slowly in the last decade, but the economy provided a substantial increase in wages for those who were employed.

Growth of Employment and Wages in Washington

Description

Employment growth is measured by the annual percent change in employment in a state or country..

Importance

Employment is the main source of income for most Americans. Having a well paying job that provides benefits such as insurance is important to working age adults.

Data Sources and Quality

For the U.S., the covered employment series is used, referring to employees covered by unemployment insurance. For international comparisons, we use an employment measure from the Organization for Economic Cooperation and Development that is broader but more comparable among countries; this series may capture more part-time or other arrangements between workers and employers not exactly comparable to the covered employment concept in the United States.

Determinants

Employment growth is determined by the national business cycle and the competitiveness of companies in Washington.

[2] Averages computed from tables of BLS data provided by OFM at http://www.ofm.wa.gov/trends/tables/fig103.asp and http://www.ofm.wa.gov/trends/tables/fig102.asp.

	Employment	Wages
2002	-1.7%	2.1%
2003	0.4%	2.0%
2004	1.6%	0.9%
2005	2.7%	3.5%
2006	3.0%	5.3%
2007	2.7%	5.0%
2008	0.8%	3.4%

Source: Bureau of Labor Statistics, U.S. Department of Labor

Washington Compared to Other States and Nations

Employment in Washington grew at a very modest pace in 2008, but Washington's performance was considerably better than the weak expansion experienced in some peer states, or the declines seen in California, Virginia, and in the nation as a whole. Wages also grew more rapidly in Washington than in the other states or the U.S. average.

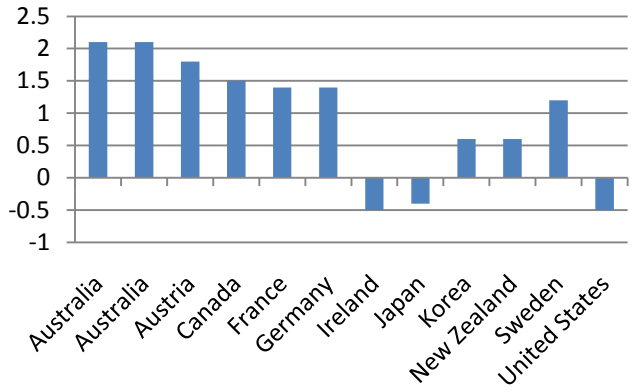
Growth of Employment and Wages, 2007-8

	Covered Employment	Annual Wages
California	-0.9%	1.9%
Colorado	0.8%	2.7%
Connecticut	0.1%	0.6%
Massachusetts	0.4%	2.7%
Virginia	-0.2%	2.7%
Washington	0.8%	3.4%
U.S.	-0.4%	2.5%

Source: Bureau of Labor Statistics, U.S. Department of Labor

While employment declined in the U.S in 2008, substantial growth between 0.5 and 2 percent was apparent in the majority of countries shown in the figure below. Ireland and Japan joined the U.S. in experiencing employment decline in 2008. In this context, the growth rate in Washington was moderate, falling within the range shown for other countries that experienced growth, and exceeding the rate in our own country.

Employment Growth by Nation, 2007-8



Source: Organization for Economic Cooperation and Development

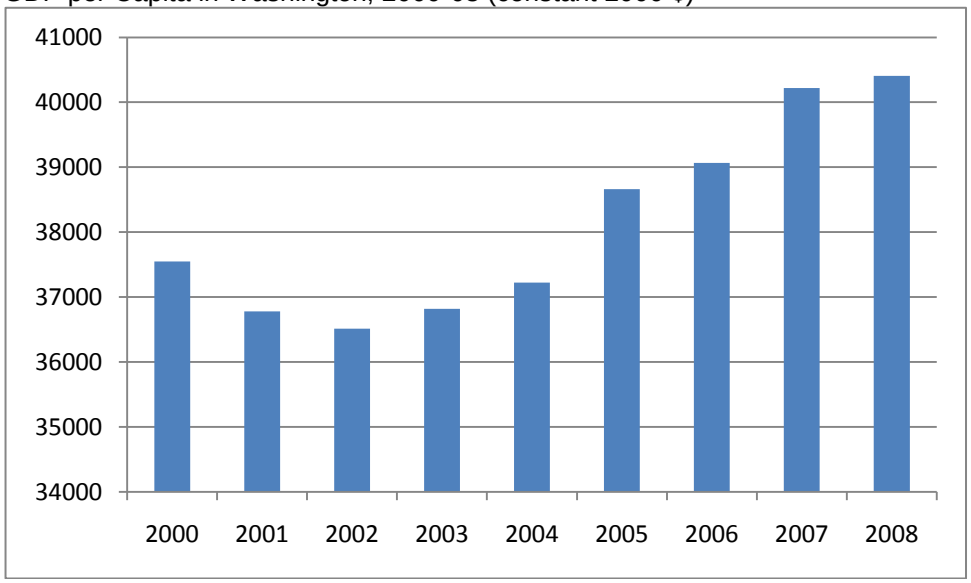
Standard of Living

GDP per Capita

Trends in Washington

GDP per capita grew through the last decade, after a recession in 2001-02. By 2008, GDP per capita in Washington toped $40,000 per person in 2000 value dollars, or $53,937 in current dollars.

GDP per Capita in Washington, 2000-08 (constant 2000 $)



Source: Bureau of Economic Analysis

Description

GDP per capita is the ratio of GDP to the number of residents in the state or country. GDP per capita is the broadest measure of the goods and services available to the typical resident.

Importance

The goal of an economy is to satisfy the myriad demands citizens of a place may have for various goods and services. The higher GDP per capita is, the greater is the range and quantity of goods and services available.

Data Sources and Quality

The Bureau of Economic Analysis, U.S. Department of Commerce prepares GDP estimates; BEA coordinates with other countries to ensure that GDP estimates are prepared in a comparable manner.

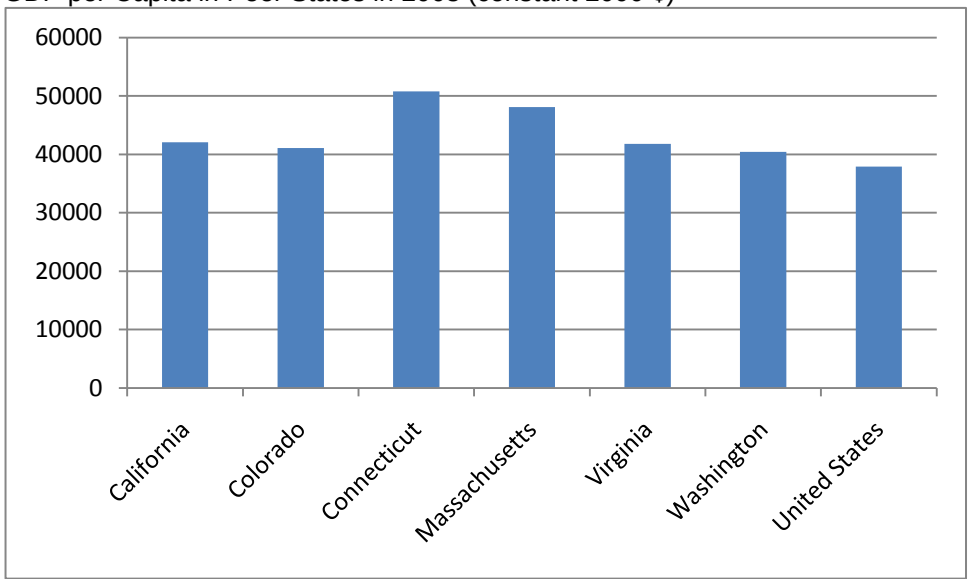
Determinants

GDP per capita depends on the wealth producing ability of each economy relative to the size of the population.

Washington Compared to Other States and Nations

In 2008, GDP per capita in Washington was $40,407, slightly higher than in the nation and very close to the level in four peer states. However, in Connecticut and Massachusetts, GDP per capita was significantly higher than in the other peer states, topping $50,000 in Connecticut and over $48,000 in Massachusetts.

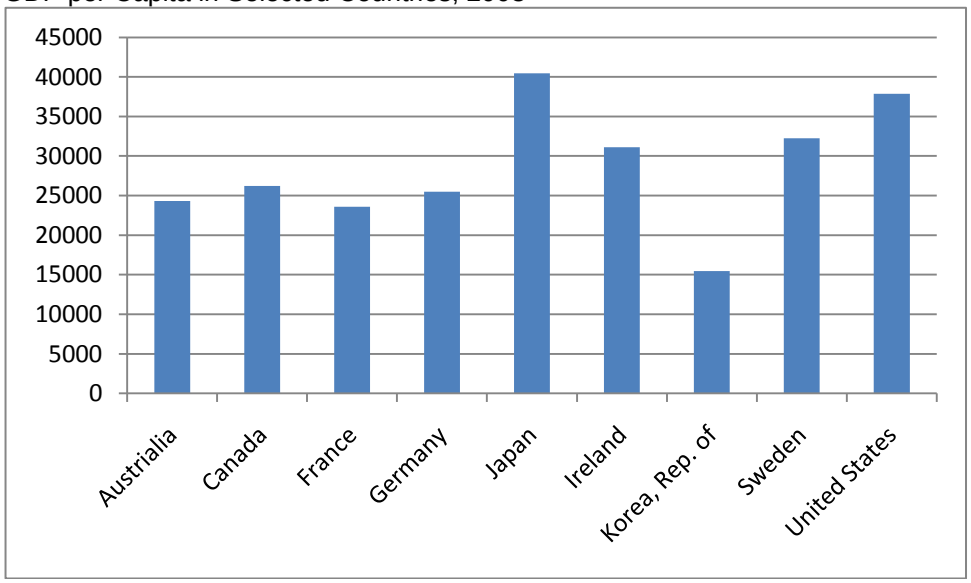
GDP per Capita in Peer States in 2008 (constant 2000 $)



Source: Bureau of Economic Analysis

GDP per capita in the United States was at the second highest level shown in the chart below. Japan had a significantly higher figure that year, quite close the level in Washington.

GDP per Capita in Selected Countries, 2008



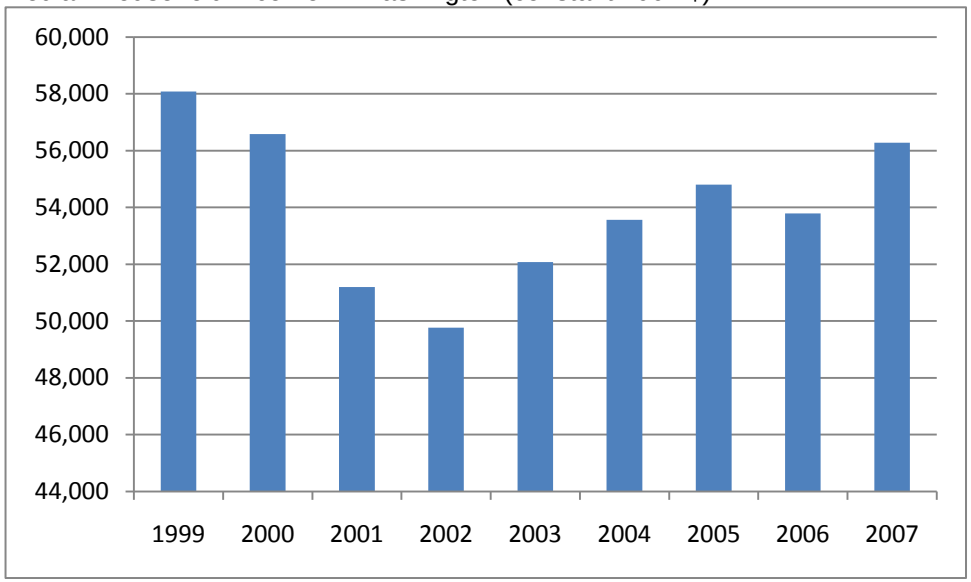
Source: World Development Indicators

Income Distribtution

Trends in Washington

Household incomes are responsive to the state of the economy, and the recession of 2001-2 is clearly shown in the chart below. Household income tumbled from $58,000 in 1999 to under $50,000 in 2002, and then recovered through 2007. However, the level in 2007, the latest year available, was below the 1999 peak. 2007 was the last year of recovery before the "great recession" began; household income data will show another dip after 2007.

Median Household Income in Washington (constant 2007 $)



Source: U.S. Census

Description

Household income is a measure of well-being in a place. In the United States, data are collected on a per household basis. No comparable data exist internationally.

Importance

Income and consumption possibilities are a final outcome of economic activity of significance to every household.

Data Sources and Quality

No source has been found providing the same metric for U.S. states and for international comparisons. Census data from the annual American Community Survey is used within the U.S. Income distribution measures (income by quintiles) are available nationally but not for states.

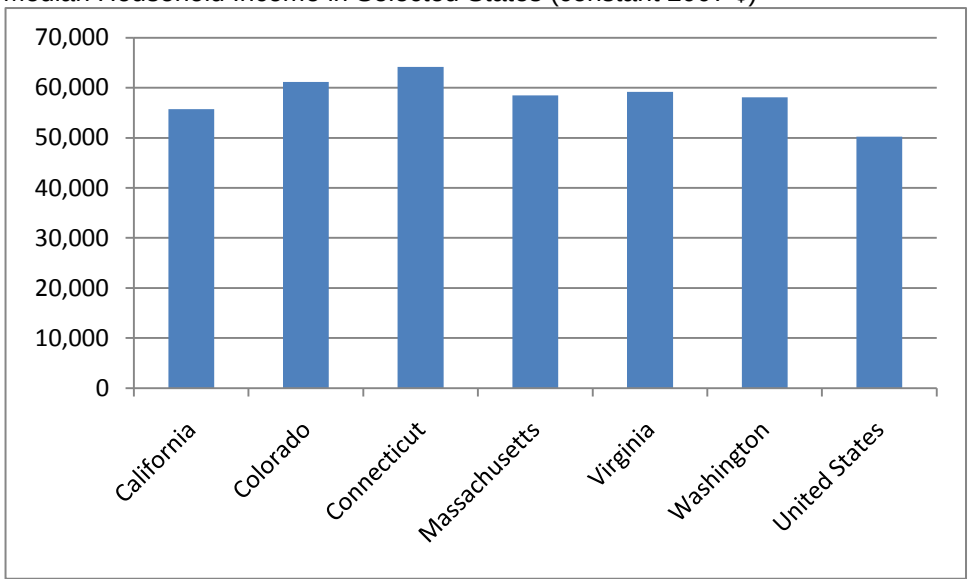
Determinants

Median household income is powerfully affected by the overall state of the economy. Many households experience spells of unemployment for one or more household members during recessions, reducing incomes during recessions. Incomes generally grow during economic expansions, but the pace of growth varies from one expansion to another.

Washington Compared to Other States

Compared to peer states, Washington's median household income is similar to the level in all of the states except Colorado and Connecticut, which have higher income levels. The median level in all of these states is higher than that in the U.S. as a whole by about $10,000.

Median Household Income in Selected States (constant 2007 $)



Source: U.S. Census

State Revenues

Trends in Washington

Tax revenues were growing strongly from 2002 to 2007, a period of expansion in the state economy. However, much of the growth was probably due to the emerging housing bubble, bringing in non-sustainable revenue growth from construction related tax sources.

State/Local Tax Revenue per Capita

Year	Revenue Per capita	% Change
2004	3,465	
2005	3,669	5.9%
2006	3,950	7.7%
2007	4,259	7.8%

Source: Tax Policy Center

Washington Compared to Other States and Nations

State taxes in Washington fall in the middle of the range shown in the table below for several states, higher than in California or Virginia, but lower than in California, Connecticut or Massachusetts. In terms of national ranking, Washington is also in the middle at 18th. Given the rationale above that taxes can be either too high or too low to achieve a healthy economy, these data suggest that Washington's state taxes may be at an appropriate level.

State/Local Tax Revenue per Capita and Rank among States

	Per Capita	Rank
California	$4,774	10
Colorado	$3,848	28
Connecticut	$6,046	5
Massachusetts	$4,942	8
Virginia	$4,194	18
Washington	$4,259	16

Source: Tax Policy Center

Description

Tax revenue per capita assesses the level of taxes imposed by a state or country. By expressing tax revenues on a per capita basis, the level of taxation in states and countries of different sizes can be compared.

Importance

Tax revenues fund essential public programs. To have an effective innovation policy, a state needs adequate revenues, and revenue growth proportionate to the expansion in needs for public programs. However, a excessively high tax level can impede the competitiveness of the private sector. Thus, the overall level of taxes needs to be monitored to ensure that competitiveness problems are not apparent.

Data Sources and Quality

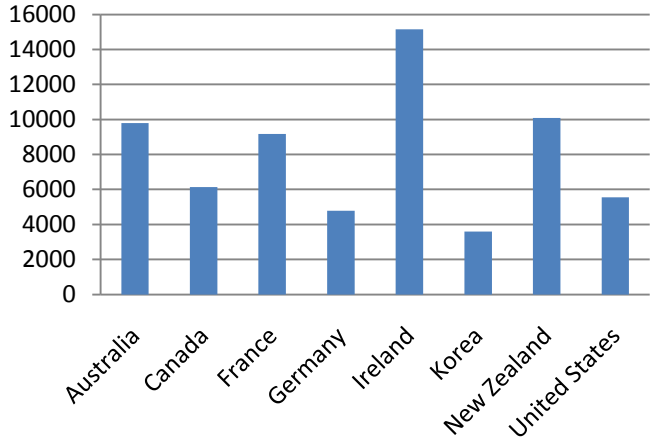
Because Washington State collects property taxes for schools and re-distributes them according to a formula to equalize opportunity, and other states leave school financing to local government, the metric used here is state and local revenue combined.

Determinants

Tax levels are set by state and local legislative bodies in response to the preferences of that state's citizens.

Internationally, the United States falls in the middle of the pack, with four countries having higher tax burdens on a per capita basis and three having similar or lower tax burdens. The level in the United States is very close to that in Canada, our neighbor and a large trading partner. Since excessively high taxes can be burdensome and low taxes could result in insufficient funding for essential services and inadequate support for innovation programs, being in the middle of the pack and close to the level of taxes in a neighboring country and trading partner is an indicator of appropriate tax policy.

Tax revenue per capita (current US $)



Source: World Bank, World Development Indicators

Concluding Comments

This document was prepared in response to a request from the State of Washington Economic Development Commission to develop a set of measures comparing Washington State to a set of peer states and to relevant foreign countries. The consultants attempted to find measures similar to those included in the *Washington Innovation Economy*, released by the Washington State Economic Development Commission in February 2009.[3] We were not able to find measures for all of these indicators. However, the overall result of this initial exercise of benchmarking of this type for our state places us in a less competitive position than would probably be the desire of state legislators and policymakers. It was not our task to to draw conclusions as to why Washington places where it does on these indicators, or to suggest what policymakers should do. That is a next step for others.

This analysis is an experiment in many ways. While not tracking the same topics as included in Atkinson's *The 2007 State New Economy Index*[4]it does provide an alternative to other recent analyses of the Washington economy, including the work at the Prosperity Partnership and by the Washington State Economic Development Commission and Workforce Training and Education Coordinating Board[5]. Clearly, there is much room for innovation in approaches to economic development. This report needs to be placed alongside other recent efforts, and contextualized as Washington State finds ways to richen its position against competing states.

[3] http://www.wedc.wa.gov/Download%20files/WEDCStrategyDRAFTRelease.pdf
[4] http://www.kauffman.org/uploadedfiles/2007_State_Index.pdf
[5]Sommers, P, W. Beyers and A. Wenzl, Industry cluster analysis for Washington Workforce Development Areas, report for the Washington State Workforce Training and Education Coordinating Board, November 2008 (http://www.wedc.wa.gov/Download%20files/ClusterAnalysisReport.pdf); sections of this report and added graphical material for the 12 workforce areas can be found at http://www.wtb.wa.gov/ClusterAnalysis.asp.